each site. The commentor recommended that specific deployment plans, flexible enough to allow for specific conditions occurring during a spill, be developed and field tested for all of the environmentally sensitive sites identified in Port Valdez.

The Department has considered this comment and agrees that it would be worthwhile for the plan holder to devise site specific and season specific deployment strategies (not a full protection plan with pre-deployed equipment) for the priority areas identified in the contingency plan. Since this has already been completed for the Hatchery and the Duck Flats, ten sites remain to be considered. The Department believes it would be reasonable, through tabletop drills and actual exercises to complete this task over the term of the plan approval. As a condition of plan approval, the Department will require the plan holder to provide a schedule for developing the deployment strategies for the remaining 10 areas. The regulatory authority relevant to this requirement are 18 AAC 75.425(e)(1)(F)(I), procedures to stop the discharge at its source and prevent its further spread and 18 AAC 75.425(e)(3)(J), protection of environmentally sensitive areas and areas of public concern.

2. Valdez Duck Flats and Solomon Gulch Hatchery: ADF&G's comment was that agencies and the plan holder jointly define the term "automatic" including the need to predesignate response personnel and the level of spill which would trigger a response.

This issue was identified during the Eastern Lion Spill, where oil sheens reached both the Hatchery and the Duck Flats. ADEC staff recall that there had been an understanding following the Eastern Loin spill that SERVS would maintain an identified crew ready to deploy protection at Solomon Gulch, with dedicated equipment stored on location. Sufficient personnel were to be maintained to perform this function without compromising VMT response efforts. This seemed to be an issue of concern to the Planning Section during the drill. The Department concludes that this issue must be resolved as a condition of plan approval.

3. ATOM Model and Oil Spill Trajectories: Both citizen and agency reviewers have commented on the lack of accuracy of the ATOM model in the near shore environment of Port Valdez. In addition to agency comments, citizen reviewers have noted that "the computer model trajectory example for Port Valdez is incomplete and does not look realistic, based upon local knowledge". Both commentors recommend that the model be further verified and tested.

The Department concurs with these comments and finds that the ATOM model needs to be improved if it is to be a reliable tool to forecast spill trajectories in the area of the Terminal. Until such time that this is accomplished, the Department will require the plan holder to more fully describe the use of other more realistic "procedures and methods for real-time surveillance and tracking of the discharged oil on open water and forecasting of its expected points of

shoreline contact" (18 AAC 75.425 (e)(1)(F)(iv). The ATOM model may continue to be appropriate as a long range forecast tool for large scale oil transport even though its limitations in the nearshore environment. especially nearby the Terminal are acknowledged.

It should be noted that by the next plan renewal, the Department will have amended the Oil and Hazardous Substances Pollution Control Regulations. It is anticipated that the new section on Best Available Technology (BAT) reviews will require that trajectory analyses and forecasts be subject to BAT review. Therefore, the next time the plan is renewed, the Department will evaluate the trajectory model for best available technology based on several criteria, as set in the soon-to-be adopted regulations, including increased environmental benefits and whether the technology is compatible with existing operations.

4. May 15, 1996 VMT Drill Lessons Learned:

A commentor stated that the Lessons Learned from the May 15 drill should be completed prior to Plan approval. The Department has considered this comment. Summary comments/assessments and lessons learned have been received from all participants, including Alyeska, and that the primary lessons learned directly relevant to the plan have been addressed in the three issues as described above. Other elements of the lessons learned, such as the issue of most efficient equipment use and equipment breakdowns are considered to be more appropriately dealt with as inspection and compliance matters.

In a separate transmittal to the plan holder, the Department is requiring some updates to the C-plan based on experiences from this drill, such as to modify the response section of the Plan to include the general procedures that will determine when the Valdez Emergency Operations Center is to be the command center for a Terminal incident.

ISSUE #14 TRANSFERS BETWEEN PLAN HOLDERS

A comment was received which raised the concern that both the shippers, through the Prince William Sound Tanker C-Plans and Alyeska, through the VMT C-Plan, rely on SERVS' equipment inventory to meet their response planning standard. This comment was given consideration in that State regulations specifically address transfers of equipment, materials or personnel between plan holders. In this case, SERVS has the role of the plan holder for the VMT Plan and has the role of an oil spill response action contractor for the Tanker Plans. The regulations under 18 AAC 75.470 (b)(1)(D) give the Department the discretion to approve a transfer between plan holders after consideration of a number of factors, one of which may

include "any compensating measures that will be taken by the provider to prevent or reduce the size of potential discharges during the period of reduced response capability..."

The Department finds that it is appropriate and necessary to acknowledge the relationship between the two sets of plans and the reliance of both on the resources of SERVS. The Department, the plan holders and the managers of spill cooperatives must explore the compensating measures necessary during the potential event of a major spill under either set of plans, to assure that adequate resources remain available to each plan holder. The Department will require that plan holders work with the Department to formulate guidelines to address compensating measures, such as a reduction in activities at the Terminal or tanker transportation, that may be enacted by the plan holders during an event.

ISSUE #15 PUBLIC HEARING COMMENTS

During the public hearings, one individual gave extensive testimony on issues at the Terminal, most of which were not previously addressed in the Draft Findings document. The individual referenced his previous dealings with the Joint Pipeline Office and Alyeska as a "former concerned employee". The Department has analyzed the comments received by this individual based on what was said during the public hearings and information received from the Alyeska Business Practices Office, which oversees Alyeska's Concerned Employee Program.

Of the numerous topics brought up during the public testimony, most have been found to have previously been addressed through Alyeska's Concerned Employees's Program. As were the concerns listed during the public hearings, the concerns researched through the Concerned Employee Program focused primarily on the handling of engineering design drawing development and control, and documentation practices of Alyeska and its contractors, which could affect the overall integrity, safety and reliability of the pipeline system.

The topics that were brought up during the public hearings can be categorized into two major elements: 1) Global Process and Procedural Issues and 2) Technical Issues. The Process and Procedural Issues address engineering design practices and the various policies, procedures and standards that are used to conduct engineering within Alyeska and their engineering contractors. The Technical issues address specific installations throughout the pipeline system and provide (according to the concerned employee) real life examples of how the global Process and Procedural Issues manifest themselves in the field.

As part of the Department's research into the individual's comments, we have identified the issues given during the public hearings and correlated them with issues previously addressed by

the Concerned Employee Program. The issues identified and the responses given by the Concerned Employee Program are summarized as follows:

PROCESS/PROCEDURAL ISSUES

a) Professional Engineer Sealing of Documents - The individual commented that engineers were seen stamping drawings in areas they were not familiar. Response: The investigators did not see evidence of this situation, but did suggest that the specific drawing in question be reviewed. The consultant also suggested that research be done to obtain an interpretation of specifically, which documents are required to be sealed.

b) As-Built Drawing Preparation and Maintenance - The individual commented that the as-built drawings were inaccurate and not up to date. Response: Updated drawings of the necessary as-builts are currently being made and will be submitted to the JPO for approval.

c) Utilization of P&ID's - The individual's comments had to do with the concern that Piping and Instrumentation Documentation (P&ID) drawings are not always included in piping design packages. Response: The investigators were unable to substantiate this problem, however, they did state that Alyeska's current drawing control program requires preparation of as-built P&ID's and if followed consistently, will ensure P&ID's are included in design packages.

d) Piping Standards - The individual commented that engineers at the Terminal were not following piping design standards and that the systems are not in compliance with ANSI Codes. Response: The investigators did find that Alyeska specifications were not being used and therefore recommended that engineers and designers be issued the appropriate standard specification for execution of the work. The consultant reviewed the index of Alyeska's document " Master Specifications According to Discipline" and found that certain specifications relating to piping were missing.

e) Use of Isolation/Insulation Kits - The individual commented that one of the sources of sparks at the tank farms could be that isolation kits for flanged piping connections between dissimilar metals are not regularly used. Response: The investigator's response was that their practice does not include the use of insulation kits under these circumstances, however, they do install these kits in other situations. They recommended that Alyeska revisit its policy regarding the use of these kits in all locations and require that adjustments be made to meet the policy.

f) Personal Safety Issues - The individual commented that neither certain Alyeska employees or contractors were familiar with applicable safety programs. Response: The investigator's analysis of this concern is that during the period to which the commentor was referring, there remains

confusion regarding what programs were necessary and when they were administered. Record keeping was found to be inconsistent and does not appear to accurately document events as they occurred. The investigators attribute much of this to the start of the Veco/Alyeska Alliance and has determined that programs have improved considerably since that time.

The Department, in coordination with the Joint Pipeline Office, is tracking the resolution of these issues.

TECHNICAL ISSUES

a) Ballast Water Treatment Plant, Oil Recovery Building - The individual commented on safety issues regarding the Oil Recovery Building at the BWT, specifically having to do with the storage of corrosion inhibitor and trucks that were illegally parked in the building, causing a volatile situation. Response: Investigators researched the storage of this inhibitor, and at the time of their investigation, inhibitor injection had been stopped. In the fall of 1996, the JPO was told that inhibitor injection was begun again so this issue will need to be opened to further the investigation. Alyeska personnel were asked by the consultants about vehicles in the building and the consultants were satisfied that the area was routinely tested for hydrocarbons before vehicles were brought in to verify that an explosive situation does not exist.

b) Ballast Water Treatment Plant - Peroxide Injection System - The individual noted that aspects of the BWT system were outdated and inaccurate. The investigators agreed that there were not adequate, up to date as-builts of the areas described and that certain procedures at Alyeska, namely, PIP 5.3, Item 5.6 - Principle Implementing Procedures, Temporary Design Changes, and Field Action Requests, were not properly implemented. The investigators indicated that as-builts have now been prepared, although they stressed the importance of following the prescribed processes.

c) East Tank Farm Observations - The individual made a number of comments concerning condition in the East Tank Farm, including observations of corrosion on tank tops, tank buckling, and missing support bolts. Response: Investigators found that some of the issues, such as those of the missing bolts were addressed, however, the issue of tank denting needed further investigation. The consultants remain concerned about the tank inspection program and suggested that past inspection programs may have been inadequate. As a result, the consultants have recommended that a tank inspection company be requested to review Alyeska's tank inspection criteria.

d) Specific Comments About the Contingency Plan - The commentor pointed out discrepancies between some information listed in the VMT C-Plan and the individuals' observations, such as

diagrams in the plan. No corresponding issues were found in the June, 1996 report. These comments have been summarized by the Department and sent to the Alyeska Concerned Employee's Program. The Department is working with the employee concerns office to track all of these issues to conclusion. If any significant findings come about as a result of this investigation, it will be necessary to require the plan holder to modify the contingency plan.

REFERENCES

[1] Alyeska Pipeline Service Company, "EC-71-VT, Emergency Contingency Action Plan, Valdez Marine Terminal", Revision 3 - Second Edition, June 23, 1995.

[2] Hildebrand and Noll Associates, Inc., "Valdez Marine Terminal: Preventing or Controlling a Fire Hazard During a Spill Response", December 6, 1996.

[3] Alaska Department of Environmental Conservation, "Oil Discharge Prevention and Contingency Plan Application and Review Guidelines", July, 1994.

[4] Alaska Regional Response Team, "In Situ Burning Guidelines for Alaska", Annex F, Appendix 2, Unified Plan, 1994.

[5] Alaska Department of Environmental Conservation, "White Paper on Secondary Containment", March 1996.

[6] EMCON Alaska, Inc., "Geologic Assessment of the BWT 90s Tanks Bedrock Secondary Containment", September, 1996.

[7] J. P. Singh and Associates, "Valdez Marine Terminal Slope Stability/Geotechnical Review", December, 1996.

[8] W. H. Newbold. Letter to Ralph Kiehl. October 31, 1996.

[9] L. D. Shier. Letter to Bonnie Friedman. October 28, 1996.

[10] J. D. Baldridge. Letter to Bonnie Friedman. August 21, 1996

[11] W. H. Newbold. Letter to Bonnie Friedman. July 24, 1996

[12] R. Krenzelok, JPO. Memo to J. Brossia. Attachment: Engineering Report JPO-95-5-108, January 10, 1996.

[13] T. Chapple. Letter to PWS Tanker Plan Holders. September 20, 1996

[14] T. Chapple. Letter to PWS Tanker Plan Holders. August 1, 1996

Government Letter 98-13340
File 8.2.2

July 21, 1998

Bonnie Friedman
Alaska Dept. of Environmental Conservation
Joint Pipeline Office
411 West 4th Ave., Suite 2B
Anchorage, Alaska 99501-2343

SERVS
Ship Escort/ Response Vessel System

Alyeska pipeline

Valdez Escort Response Base

200 S. Harbor Dr.
P.O. Box 109
Valdez, Alaska 99686
Telephone 907 835-6885
Fax 907 835-6944

Reference: VMT Oil Discharge Prevention and Contingency Plan, Condition of Approval #5 Leak Detection

Dear Ms. Friedman:

Enclosed is the twelve month comparative data summary report covering static leak detection sensitivity for crude oil tanks not installed with cathodic protection.

This report provides a comprehensive summary explaining the leak detection experimentation on the tanks based on API Publication No. 325 study, An Evaluation of a Methodology for the Detection of Leaks in Aboveground Storage Tanks. Testing methodology and the analysis process is discussed in the attached Leak Detection Summary followed by a comprehensive conclusion specifically recommending monthly 48 hour leak detection periods for tanks not having cathodic protection. The six remaining tanks in the East Tank Farm without cathodic protection at this time will have cathodic protection installed. This project is scheduled over the next three years. Final completion of this installation is anticipated by 2001. With this submission, Condition of Approval No. 5 is complete.

If you have any questions please call me at (907) 834-6985, or Jule Magee at (907) 834-6910.

Sincerely,

Dennis Maguire
Regulatory Manager

Enclosures: (2)

cc: Jerry Brossia, Authorized Officer, Branch of Pipeline Monitoring
William Britt, State Pipeline Coordinator
Joel Kopp, RCAC
Mike Wrabets, BLM
Tom Chapple, Manager of Pipeline Operations
JPO Library
John Baldridge
Rex Brown
Dennis Cole
Andy Sorensen
Jule Magee
Karen Kilty
Gary Minish

From: Minish, Gary H.
Sent: July 18 1998 03:09
To: Magee, Jule L.; Maguire, Dennis M.
Cc: Cole, Dennis G.; Flynn , Edmond T.; Albright, Randall D.; Kennedy, Barry M.
Subject: Summary of the Alyeska Valdez Crude Tank Static Leak Detection Experiment

Introduction:

Due to a lack of confidence in the condition of the floors in the Valdez Terminal Crude Tanks that did not have cathodic protection installed and a similar lack of confidence in the containment surrounding those tanks the ADEC approached Alyeska with the request to perform some form of static leak detection for those unprotected tanks. The method requested was based on API Publication No. 325 (titled "An Evaluation of a Methodology for the detection of leaks in Aboveground Storage Tanks"). Due to the high accuracy of the recently installed Enraf Servo Gauges, Alyeska was willing to attempt this method of leak detection but some concerns were raised as to the long term of the test recommended in this publication. The publication was a carefully controlled experiment under ideal conditions using hundreds of temperature measurements both horizontally and vertically in the test tank. This temperature measurement accuracy appeared to be critical to the success of the leak test and would be impossible for Alyeska to obtain as our crude tanks have only one temperature sensor string with only 15 vertically spaced rtd's that hang less than 3 feet from the side of a 250 ft diameter tank. Since we did have a great deal of confidence in the accuracy of the Enraf level gauges which have a resolution of +/- 0.003 ft, Alyeska suggested a shorter (2 hour) test that would rule out the effect of temperature and rely strictly on the level measurement accuracy. The result of the discussions was a request by the ADEC for Alyeska to perform a year of experimentation on the tanks that did not have cathodic protection for the purpose of gathering a database of test results that would hopefully indicate whether or not the longer tests were statistically better or worse than the short term tests. The experiments were to include 24 hour tests on 50% of the unprotected tanks, 48 hour tests on 20% of the same tanks and 2 hour tests on the remainder of the unprotected tanks. Alyeska agreed to this experiment and the testing began.

The Tests:

Procedures were established to ensure control of the tests and reliable data gathering. Every time a tank is to be tested it is first isolated from the tank farm crude oil header by closing the manifold valves and opening the breakers then opening the tank inlet valve. The tank is then allowed to settle for a minimum of two hours. The opening level and temperature is obtained from OCC and is entered in the spreadsheet that calculates the net (temperature corrected) volumes. After the allotted time has passed the closing level and temperature is obtained from OCC, the inlet valve is closed, the manifold valve breakers are closed, the valves are left in whatever position that the OCC desires and the closing data is entered in the spreadsheet. The spreadsheet calculates the closing net volume and the difference from the opening net volume. Since the Tank Farm Operators also do monthly PM's to verify the level and temperature instruments on all of the tanks and since that process involves the same information gathering, the 2 hour tests are done in conjunction with the PMs. This gave us a lot of extra baseline data on the resolution of the Enraf level gauges.

Analysis:

After gathering a years worth of data and examining it from many different angles we have observed some very interesting and somewhat surprising results. First of all, the 2 hour tests did indeed appear to eliminate the temperature influence as shown by the attached graph of the results. The volume changes are quite random and equally above and below the zero line (the average change was -2.68 bbls). Although there were occasional spikes as high as 197 bbls and as low as -121 bbls the sample standard deviation was 41.98 bbls. The surprising part was that the 24 and 48 hour tests had only slightly larger

standard deviations (47.32 & 54.04 bbls respectively). Also of interest and some concern to us was the fact that both the 24 and 48 hour test results were clearly biased in the negative direction. The 24 hour volume changes averaged -37 bbls and the 48 hour volume changes averaged -48.76 bbls. In an attempt to explain the negative bias we gathered some data from the OCC computer's historical database that was in half hour intervals. When looking at the level, temperature and volume data in half hour increments over a 48 hour period for tanks that were off flow (inlet valve closed) we could get a better idea of the dynamics of the temperature affect. This data seems to indicate that the physical volume shrinkage leads the temperature measurement resulting in delayed temperature compensation which in turn results in a declining net volume. When the temperature exchange slows and the temperature measurement catches up with the volume shrinkage the compensation catches up also resulting in a net volume rise. Since the ambient temperature in Valdez is almost always lower than the crude temperature the most common trend is the volume change leading the temperature measurement, thus the negative bias.

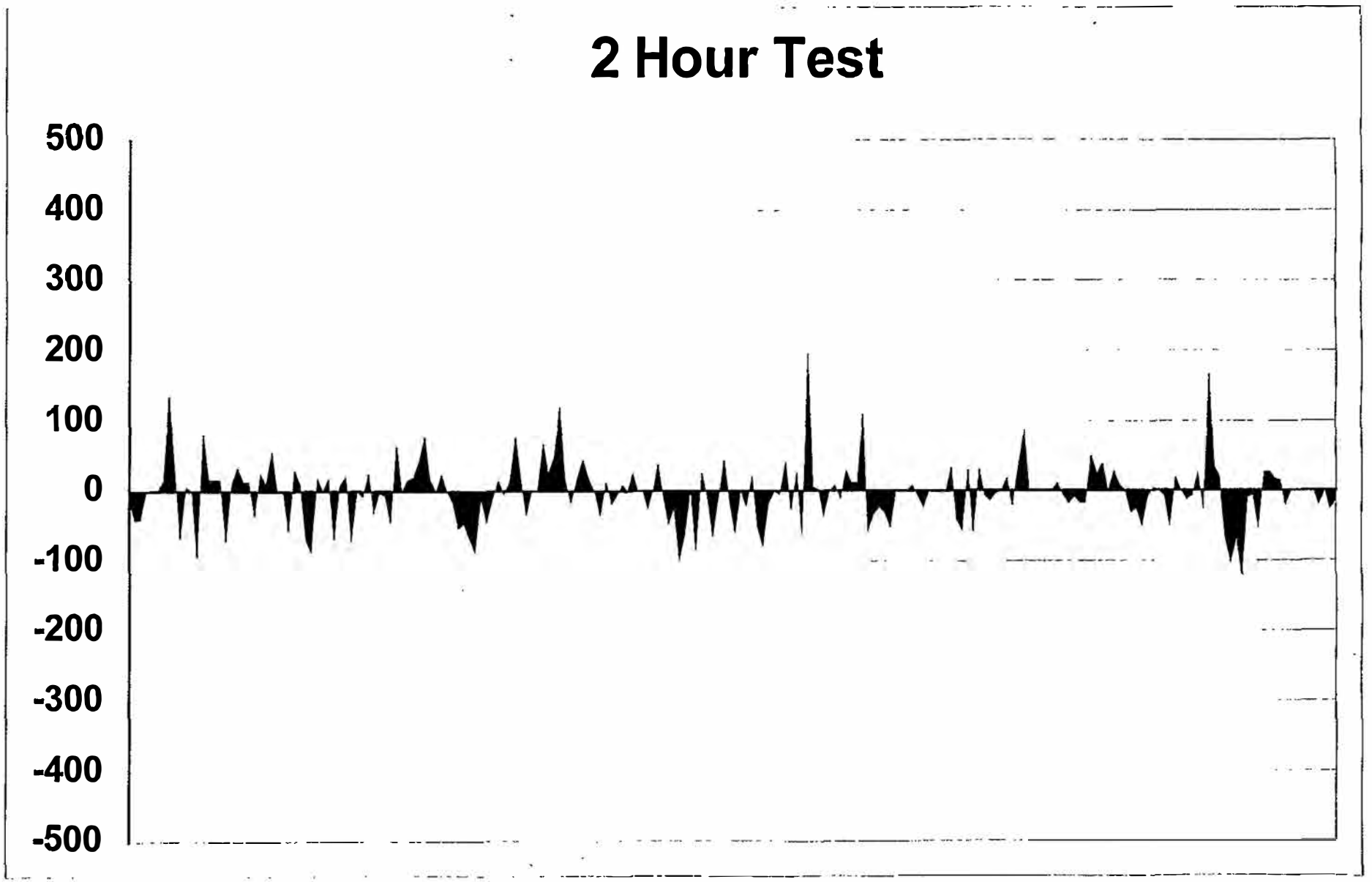
Conclusion:

Since all of the tests have approximately the same resolution (as shown by the sample standard deviations) the longest test will obviously detect the smallest leak rate (barrels per hour). The attached statistical data shows that the best possible resolution of the 2 hour test is approximately 15.5 bbls/hr, the best resolution of the 24 hour test is approximately 2 bbls/hr and the best resolution of the 48 hour test is approximately 1 bbl/hr. Therefore it is Alyeska's recommendation to use a monthly 48 hour leak test to monitor the integrity of all crude oil tanks that do not have cathodic protection. It is important though to recognize that the 48 hour test has an inherent -50 bbl bias so the recommended alarm point would be -130 bbls. This is the average test result of -50 bbls minus the 50 bbl average deviation minus 30 bbls to put the alarm point outside of the occasional noise which is necessary to prevent very costly false alarms. This setting would result in an alarm point equivalent to a leak rate of approximately 1.7 bbl/hr. Since instrument errors and other factors could occasionally cause unusually large results, Alyeska's suggested response to a test result below -130 bbls would be to verify the instruments with hand measurements then run follow up tests to determine whether or not the volume change is consistent. If the follow up tests agree with the initial test the tank would be removed from service, visual checks of the tank and surrounding containment area would be initiated and appropriate levels of Alyeska management would be notified so that further action could be discussed and initiated.

2 HOUR TESTS
STATISTICS

Sample Standard Deviation	41.98	bbls
Average	-2.68	bbls
Maximum	197	bbls
Minimum	-121	bbls
Average Length of Test	2.7	hours
Test Resolution (SSD/Avg hrs)	15.55	bbls/hr

2 Hour Test



2 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
6	01/15/97	06:30 PM	30.0	58.570	72.8	512711	01/15/97	11:58 PM	5.47	58.560	72.5	512696	-15
5	01/15/97	06:30 PM	30.0	58.500	72.8	512213	01/15/97	10:52 PM	4.37	58.490	72.6	512172	-41
2	01/15/97	06:30 PM	30.0	58.490	73.5	511065	01/15/97	08:45 PM	2.25	58.480	73.3	511025	-40
4	01/15/97	06:30 PM	30.0	58.540	73.5	512187	01/15/97	09:03 PM	2.55	58.540	73.5	512187	0
16	01/16/97	09:40 AM	30.1	58.430	68.0	512816	01/16/97	12:00 PM	2.33	58.430	68.0	512816	0
15	01/16/97	09:40 AM	30.1	58.320	68.1	512110	01/16/97	12:00 PM	2.33	58.320	68.1	512110	0
9	01/25/97	12:05 AM	30.0	41.950	70.3	369702	01/25/97	02:20 AM	2.25	41.950	70.2	369717	15
8	01/25/97	12:05 AM	30.0	43.840	71.2	385202	01/25/97	03:10 AM	3.08	43.850	70.9	385339	137
7	01/25/97	12:05 AM	30.0	43.790	70.8	384833	01/25/97	03:25 AM	3.33	43.790	70.6	384868	35
10	01/25/97	12:05 AM	30.0	42.200	72.1	370975	01/25/97	01:50 AM	1.75	42.190	72.0	370907	-68
13	02/01/97	12:50 AM	29.9	22.070	43.7	199143	02/01/97	02:45 AM	1.92	22.071	43.7	199149	6
11	02/01/97	12:50 AM	29.9	20.210	67.3	180698	02/01/97	02:00 AM	1.17	20.209	67.2	180699	1
14	02/01/97	12:50 AM	29.9	20.260	56.4	181936	02/01/97	03:15 AM	2.42	20.260	57.5	181843	-93
12	02/01/97	12:50 AM	29.9	20.230	66.8	181432	02/01/97	02:30 AM	1.67	20.231	65.9	181515	83
12	02/12/97	09:15 PM	29.9	46.920	61.2	414549	02/12/97	11:45 PM	2.50	46.920	61.1	414566	17
14	02/12/97	09:15 PM	29.9	46.290	59.6	408505	02/13/97	12:01 AM	2.77	46.290	59.5	408522	17
11	02/12/97	09:15 PM	29.9	46.490	61.8	410134	02/12/97	11:10 PM	1.92	46.490	61.7	410150	16
13	02/13/97	07:00 PM	29.9	35 300	61.7	312785	02/13/97	09:57 PM	3.00	35.290	61.6	312713	-72
3	02/13/97	11:15 AM	29.9	31 820	76.3	280325	02/13/97	01:20 PM	2.08	31.820	76.2	280337	12
1	02/13/97	01:55 PM	29 2	43.070	75.2	377283	02/13/97	04:10 PM	2.25	43.070	75.0	377317	34
2	02/13/97	11:15 AM	29.9	31 730	71.0	279524	02/13/97	02:00 PM	2.75	31.730	70.9	279538	14
4	02/13/97	11:15 AM	29.9	31 650	71.6	279320	02/13/97	01:40 PM	2.42	31.650	71.5	279334	14
17	02/16/97	08:00 AM	29.2	57 216	66 5	502510	02/16/97	10:30 AM	2.50	57.212	66.5	502475	-35
15	02/21/97	12:15 AM	29.8	57 620	64 9	506125	02/21/97	03:19 AM	3.07	57.620	64.8	506150	25
5	02/21/97	06:00 PM	30.0	28 100	72.3	248703	02/21/97	08:26 PM	2.43	28.100	72.2	248713	10
6	02/21/97	06:00 PM	30.0	28.040	73.4	247977	02/21/97	09:04 PM	3.07	28.040	72.9	248034	57
8	02/21/97	07:00 PM	30.0	28.910	71.8	255682	02/21/97	10:04 PM	3.07	28.910	71.8	255682	0
7	02/21/97	07:00 PM	30.0	28.900	73.6	255377	02/21/97	09:38 PM	2.63	28.900	73.6	255377	0
9	02/22/97	12:10 PM	30.0	39.140	72.6	344936	02/22/97	03:30 PM	3.33	39.130	72.4	344880	-56
10	02/22/97	12:10 PM	30.0	39.110	72.5	344121	02/22/97	04:30 PM	4.33	39.110	72.3	344152	31
16	02/28/97	12:45 PM	29.9	25.350	63.4	225814	02/28/97	01:55 PM	1.17	25.350	63.3	225823	9
5	03/09/97	12:45 PM	30.0	20.600	67.3	184123	03/09/97	04:05 PM	3.33	20.590	67.1	184054	-69
15	03/09/97	07:00 AM	30.0	57.270	51.9	505992	03/09/97	11:25 AM	4.42	57.260	51.9	505905	-87
11	03/13/97	08:15 AM	30.0	21.930	68.3	195553	03/13/97	10:25 AM	2.17	21.930	68.1	195571	18
13	03/13/97	07:10 PM	30.0	44.140	46.9	392377	03/13/97	09:30 PM	2.33	44.140	46.9	392377	0
8	03/14/97	12:53 AM	30.0	22.170	66.8	197718	03/14/97	03:32 AM	2.65	22.170	66.6	197736	18
7	03/14/97	12:53 AM	30.0	22.160	68.6	197464	03/14/97	02:55 AM	2.03	22.150	68.4	197395	-69
6	03/19/97	07:00 PM	29.5	27.600	68.0	244766	03/19/97	09:15 PM	2.25	27.600	67.9	244775	9
16	03/23/97	06:30 AM	29.7	58.460	58.9	515167	03/23/97	09:45 AM	3.25	58.460	58.8	515188	21
10	03/23/97	07:00 AM	29.7	17.840	68.9	160104	03/23/97	09:14 AM	2.23	17.830	68.7	160032	-72
9	03/23/97	06:46 AM	29.7	18.050	68.8	162359	03/23/97	09:03 AM	2.28	18.050	68.8	162359	0
1	03/26/97	11:39 AM	28.9	32.815	73.0	288810	03/26/97	01:53 PM	2.23	32.814	73.0	288802	-8
4	03/26/97	02:32 PM	28.9	29.846	68.4	264074	03/26/97	04:38 PM	2.10	29.849	68.4	264100	26
2	03/26/97	12:30 PM	28.9	30.591	66.4	270220	03/26/97	02:32 PM	2.03	30.590	66.6	270187	-33
17	03/30/97	12:30 AM	29.3	51.847	74.6	454154	03/30/97	03:40 AM	3.17	51.844	74.5	454151	-3
3	03/30/97	12:30 AM	29.7	36.843	74.6	324033	03/30/97	02:55 AM	2.42	36.840	74.5	324026	-7
16	04/02/97	10:50 PM	30.4	51.470	72.8	451303	04/03/97	02:13 AM	3.38	51.460	72.6	451258	-45
18	04/02/97	10:50 PM	30.4	57.810	70.7	506586	04/03/97	02:31 AM	3.68	57.810	70.4	506652	66
9	04/04/97	02:15 AM	30.0	44.800	68.8	395587	04/04/97	04:04 AM	1.82	44.800	68.8	395587	0

2 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
10	04/04/97	02:15 AM	30.0	45.240	71.4	397467	04/04/97	04:30 AM	2.25	45.240	71.3	397483	16
17	04/05/97	12 45 AM	30.0	58.080	69.5	509334	04/05/97	03:06 AM	2.35	58.080	69.4	509354	20
15	04/05/97	12:45 AM	30.0	51.860	71.1	454730	04/05/97	02:48 AM	2.05	51.860	70.9	454772	42
13	04/10/97	02:00 PM	30.2	50.157	44.6	445626	04/10/97	04:00 PM	2.00	50.166	44.6	445705	79
7	04/10/97	07:25 PM	30.2	40.538	74.3	356054	04/10/97	10:15 PM	2.83	40.540	74.3	356071	17
12	04/10/97	01:00 PM	30.2	20.077	52.1	181286	04/10/97	03:00 PM	2.00	20.077	52.1	181286	0
8	04/10/97	07:25 PM	30.2	40.591	73.3	356671	04/10/97	10:45 PM	3.33	40.590	73.1	356695	24
11	04/10/97	12:00 PM	30.2	20.392	52.3	183501	04/10/97	02:00 PM	2.00	20.392	52.3	183501	0
2	04/13/97	12:30 PM	30.2	46.471	73.7	406851	04/13/97	02:30 PM	2.00	46.471	73.8	406834	-17
14	04/27/97	08:15 AM	30.0	58.205	64.8	511244	04/27/97	10:47 AM	2.53	58.199	64.8	511191	-53
3	04/29/97	09:11 PM	30.0	49.160	76.8	430272	04/29/97	11:22 PM	2.18	49.150	76.6	430225	-47
1	04/30/97	12:12 AM	30.1	42.540	75.6	372596	04/30/97	02:50 AM	2.63	42.530	75.5	372528	-68
15	05/04/97	07:30 AM	30.0	58.198	70.6	509849	05/04/97	12:55 PM	5.42	58.188	70.6	509762	-87
14	05/12/97	12:11 AM	30.1	42.137	69.7	370611	05/12/97	02:50 AM	2.65	42.134	69.6	370600	-11
11	05/12/97	12:11 AM	30.1	42.513	70.6	373985	05/12/97	02:12 AM	2.02	42.510	70.7	373940	-45
13	05/12/97	12:11 AM	30.1	42.102	65.3	371452	05/12/97	03:10 AM	2.98	42.099	65.2	371440	-12
12	05/12/97	12:11 AM	30.1	42 521	70.4	374629	05/12/97	02:30 AM	2.32	42.521	70.3	374644	15
9	05/22/97	01:30 AM	30.2	36 626	72.8	323100	05/22/97	04:00 AM	2.50	36.624	72.7	323095	-5
10	05/22/97	01:30 AM	30.2	36 553	72 0	322029	05/22/97	04:30 AM	3.00	36.553	71.9	322042	13
7	05/26/97	05:00 PM	29.8	42.662	73.6	374583	05/26/97	08:00 PM	3.00	42.671	73.6	374661	78
2	05/26/97	05:00 PM	29 8	42 846	72 9	375591	05/26/97	07:30 PM	2.50	42.848	72.9	375609	18
16	05/27/97	07:30 AM	29 7	57 974	72 0	507950	05/27/97	11:30 AM	4.00	57.970	72.0	507915	-35
1	05/30/97	06:45 PM	30 5	18 140	74 4	161637	05/30/97	08:45 PM	2.00	18.140	74.4	161637	0
3	05/30/97	06:45 PM	30 5	18 400	75.4	165189	05/30/97	09:02 PM	2.28	18.400	75.4	165189	0
17	05/31/97	08:30 AM	30 2	58 450	73 3	511665	05/31/97	11:00 AM	2.50	58.455	73.2	511734	69
18	05/31/97	08:30 AM	30.2	58 518	74 0	511978	05/31/97	11:30 AM	3.00	58.521	74.0	512004	26
17	06/05/97	12:00 PM	30 0	58 402	72.1	511532	06/05/97	02:00 PM	2.00	58.423	72.7	511580	48
18	06/05/97	12:00 PM	30 0	58 456	72.7	511748	06/05/97	02:30 PM	2.50	58.486	73.3	511869	121
8	06/26/97	10:56 AM	30.8	7 011	73 5	65919	06/26/97	01:39 PM	2.72	7.013	73.5	65936	17
7	06/26/97	10:56 AM	30.8	7.043	73 9	66184	06/26/97	01:39 PM	2.72	7.041	73.9	66167	-17
15	07/13/97	07:30 PM	29.3	49.310	77 1	431478	07/13/97	09:58 PM	2.47	49.310	77.0	431496	18
17	07/13/97	07:30 PM	29.3	57.890	72.3	507065	07/13/97	10:52 PM	3.37	57.890	72.1	507111	46
16	07/13/97	07:30 PM	29.3	48.880	77.1	428060	07/13/97	10:27 PM	2.95	48.880	77.0	428077	17
12	07/18/97	08:20 AM	29.1	37.490	69 0	331159	07/18/97	10:58 AM	2.73	37.490	69.0	331159	0
11	07/18/97	08:20 AM	29.1	40.640	69 7	357881	07/18/97	10:26 AM	2.10	40.640	69.9	357846	-35
14	07/18/97	08:20 AM	29.1	37.310	70.6	328610	07/18/97	11:26 AM	3.10	37.310	70.5	328624	14
7	07/20/97	02:00 AM	29.5	30.795	75.3	271593	07/20/97	04:00 AM	2.00	30.793	75.3	271575	-18
8	07/20/97	02:00 AM	29.5	30.801	75.1	271680	07/20/97	04:00 AM	2.00	30.799	75.0	271674	-6
2	07/21/97	12:01 AM	29.5	42.812	77.2	374583	07/21/97	02:00 AM	1.98	42.813	77.2	374592	9
9	07/28/97	08:15 PM	29.3	25.064	77.0	222442	07/28/97	10:15 PM	2.00	25.064	77.0	222442	0
10	07/28/97	08:15 PM	29.3	24.991	76.7	221365	07/28/97	10:50 PM	2.58	24.994	76.7	221391	26
17	08/05/97	02:05 AM	28.6	57.716	68.4	506450	08/05/97	04:05 AM	2.00	57.716	68.4	506450	0
10	08/17/97	02:00 PM	29.1	21.521	73.5	191646	08/17/97	04:30 PM	2.50	21.521	73.5	191646	0
9	08/18/97	08:00 AM	29.3	22.836	74.0	203439	08/18/97	01:00 PM	5.00	22.830	73.7	203414	-25
7	08/23/97	10:07 PM	29.1	38.180	76.0	335409	08/24/97	03:10 AM	5.05	38.180	76.0	335409	0
2	08/23/97	01:56 PM	29.1	34.110	76.2	299480	08/23/97	04:15 PM	2.32	34.110	75.9	299519	39
8	08/27/97	02:00 PM	29.5	40.322	74.8	354123	08/27/97	04:15 PM	2.25	40.321	74.8	354114	-9
10	09/13/97	11:00 PM	29.8	50.611	73.4	443661	09/14/97	03:00 AM	4.00	50.608	73.5	443613	-48
9	09/13/97	11:00 PM	29.8	50.797	73.3	445954	09/14/97	02:30 AM	3.50	50.794	73.3	445928	-26

2 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
8	09/14/97	06:35 AM	29.8	51.483	73.3	451083	09/14/97	11:00 AM	4.42	51.469	73.2	450984	-99
7	09/14/97	06:35 AM	29.8	51.491	73.7	451073	09/14/97	10:15 AM	3.67	51.481	73.6	451009	-64
7	09/19/97	07:55 PM	29.5	36.300	72.2	320534	09/19/97	11:00 PM	3.08	36.300	72.2	320534	0
8	09/20/97	12:20 AM	29.5	29.950	71.5	264738	09/20/97	03:30 AM	3.17	29.940	71.5	264652	-86
2	09/26/97	12:30 PM	29.7	43.619	70.8	382653	09/26/97	03:30 PM	3.00	43.622	70.8	382679	26
14	09/26/97	10:00 PM	29.7	34.202	69.1	301851	09/27/97	12:10 AM	2.17	34.201	69.1	301842	-9
12	09/26/97	12:30 PM	29.7	58.363	68.6	512710	09/26/97	03:30 PM	3.00	58.366	69.0	512644	-66
13	09/26/97	09:30 PM	29.7	33.827	69.4	298925	09/27/97	12:10 AM	2.67	33.824	69.3	298914	-11
11	09/26/97	10:00 PM	29.7	34.020	69.3	300440	09/27/97	12:10 AM	2.17	34.019	68.9	300485	45
6	09/27/97	08:30 AM	29.7	26.825	69.7	237854	09/27/97	10:30 AM	2.00	26.822	69.6	237839	-15
1	09/30/97	01:00 PM	29.7	38.857	72.5	341206	09/30/97	03:00 PM	2.00	38.852	72.6	341146	-60
3	09/30/97	08:00 PM	29.5	40.290	72.9	354150	09/30/97	10:48 PM	2.80	40.290	72.9	354150	0
10	10/13/97	03:00 PM	30.2	37.142	69.2	327545	10/13/97	05:00 PM	2.00	37.138	69.1	327523	-22
6	10/16/97	09:30 PM	29.6	30.520	69.3	269959	10/16/97	11:30 PM	2.00	30.520	69.1	269981	22
8	10/17/97	08:30 PM	29.7	58.536	69.3	513169	10/17/97	11:55 PM	3.42	58.530	69.3	513117	-52
7	10/17/97	08:30 PM	29.7	58.529	69.7	513020	10/17/97	11:50 PM	3.33	58.520	69.7	512942	-78
12	10/26/97	08:00 AM	30.0	42.701	67.4	376699	10/26/97	11:15 AM	3.25	42.697	67.3	376682	-17
14	10/26/97	12:00 PM	30 0	45 764	66.4	402695	10/26/97	03:00 PM	3.00	45.762	66.3	402694	-1
13	10/26/97	12:30 PM	30.0	45.745	67.6	402736	10/26/97	02:30 PM	2.95	45.742	67.5	402731	-5
11	10/26/97	08:00 AM	30.0	42.746	67.9	376465	10/26/97	10:45 AM	2.68	42.743	67.5	376507	42
9	10/27/97	09:30 PM	30.4	56.503	67.5	496754	10/27/97	11:30 PM	2.00	56.500	67.5	496728	-26
15	10/30/97	07:00 AM	30.1	54 277	68 6	476235	10/30/97	08:00 AM	1.00	54.280	68.6	476261	26
17	10/30/97	07:00 AM	30.1	22 577	64 5	201597	10/30/97	08:00 AM	1.00	22.570	64.5	201536	-61
2	10/30/97	08:00 AM	30.1	20 694	64.9	184393	10/30/97	01:45 PM	5.75	20.710	64.2	184590	197
9	11/08/97	08:00 AM	30.2	55 501	66 8	488186	11/08/97	10:13 AM	2.22	55.499	66.7	488192	6
10	11/08/97	08:00 AM	30.2	55 428	66 7	486872	11/08/97	10:30 AM	2.50	55.426	66.6	486874	2
5	11/21/97	10:30 PM	30.1	19 736	62 9	176968	11/22/97	01:30 AM	3.00	19.730	62.7	176932	-36
13	11/22/97	07:30 PM	30.6	31 668	54.1	282099	11/23/97	12:30 AM	5.00	31.665	53.9	282098	-1
14	11/22/97	07:30 PM	30.6	42 577	59 3	376175	11/23/97	12:30 AM	5.00	42.574	59.1	376183	8
12	11/22/97	07:30 PM	30.6	21.605	54 7	194430	11/23/97	12:30 AM	5.00	21.602	54.5	194419	-11
15	11/23/97	12:30 PM	30.1	58.276	65.7	511650	11/23/97	02:30 PM	2.00	58.274	65.5	511679	29
16	11/23/97	12:30 PM	30.1	58.066	65.2	510288	11/23/97	02:30 PM	2.00	58.065	65.1	510300	12
8	11/25/97	08:10 AM	30.1	32.312	62.7	286330	11/25/97	10:53 AM	2.72	32.312	62.6	286342	12
7	11/25/97	08:10 AM	30.1	32.299	63.2	286140	11/25/97	10:10 AM	2.00	32.310	63.1	286250	110
17	11/30/97	11:05 PM	30.0	22.810	64.3	203639	12/01/97	02:46 AM	3.68	22.800	64.0	203581	-58
18	12/05/97	07:30 AM	30.2	40.748	66.2	359198	12/05/97	09:30 AM	2.00	40.742	66.1	359164	-34
16	12/05/97	07:30 AM	30.2	57.920	66.9	508630	12/05/97	09:30 AM	2.00	57.915	66.8	508607	-23
15	12/05/97	07:30 AM	30.2	58.516	67.3	513368	12/05/97	09:30 AM	2.00	58.510	67.2	513336	-32
17	12/05/97	07:30 AM	30.2	40.971	67.0	361137	12/05/97	09:30 AM	2.00	40.965	67.0	361085	-52
11	12/19/97	12:30 PM	30.0	57.949	58.0	510935	12/19/97	02:30 PM	2.01	57.949	58.0	510935	0
13	12/19/97	12:30 PM	30.0	57.833	67.4	507882	12/19/97	02:30 PM	2.01	57.830	67.3	507881	-1
14	12/19/97	12:30 PM	30.0	54.844	57.3	483597	12/19/97	02:30 PM	2.01	54.844	57.3	483597	0
10	12/19/97	12:30 PM	30.0	21.600	64.7	193076	12/19/97	02:30 PM	2.01	21.600	64.6	193084	8
9	12/21/97	06:30 PM	30.3	42.327	64.6	373926	12/21/97	09:11 PM	2.68	42.324	64.5	373918	-8
3	12/27/97	12:20 AM	30.1	46.745	64.3	411673	12/27/97	03:30 AM	3.17	46.740	64.2	411650	-23
4	12/27/97	12:20 AM	30.1	46.752	65.2	411490	12/27/97	04:00 AM	3.67	46.750	65.1	411489	-1
7	12/28/97	08:00 AM	30.4	53.695	64.5	472115	12/28/97	10:00 AM	2.00	53.693	64.4	472117	2
5	12/28/97	08:00 AM	30.4	53.793	64.6	473105	12/28/97	10:00 AM	2.00	53.790	64.5	473103	-2
8	12/28/97	08:00 AM	30.4	53.829	64.4	473296	12/28/97	10:00 AM	2.00	53.826	64.3	473294	-2

2 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
6	12/28/97	08:00 AM	30.4	53.729	65.0	472353	12/28/97	10:00 AM	2.00	53.728	64.8	472387	34
15	01/12/98	06:50 PM	30.3	57.840	55.4	510193	01/12/98	11:30 PM	4.67	57.830	55.2	510152	-41
6	01/12/98	06:50 PM	30.3	24.670	61.4	219969	01/12/98	11:30 PM	4.67	24.660	61.1	219913	-56
7	01/12/98	06:50 PM	30.3	24.760	61.0	220770	01/12/98	11:30 PM	4.67	24.760	60.7	220801	31
5	01/12/98	06:50 PM	30.3	24.750	60.3	220851	01/12/98	11:30 PM	4.67	24.740	60.0	220792	-59
8	01/12/98	06:50 PM	30.3	24.800	60.6	221166	01/12/98	11:30 PM	4.67	24.800	60.3	221197	31
18	01/14/98	10:10 PM	30.2	43.047	52.5	381516	01/15/98	01:40 AM	3.50	43.044	52.4	381509	-7
9	01/14/98	10:10 PM	30.2	26.762	62.1	238707	01/15/98	12:30 AM	2.33	26.759	62.0	238693	-14
10	01/14/98	10:10 PM	30.2	27.062	62.1	240829	01/15/98	01:05 AM	2.92	27.059	61.9	240825	-4
16	01/14/98	10:10 PM	30.2	56.550	53.2	499751	01/15/98	01:40 AM	3.50	56.547	53.1	499750	-1
2	02/08/98	07:00 AM	30.2	21.950	64.5	195339	02/08/98	11:15 AM	4.25	21.950	64.3	195357	18
17	02/08/98	07:00 AM	30.2	50.094	60.3	441768	02/08/98	12:30 PM	5.50	50.087	60.1	441747	-21
1	02/08/98	07:00 AM	30.2	22.050	62.7	196492	02/08/98	10:30 AM	3.50	22.050	62.3	196527	35
5	02/09/98	09:03 PM	30.4	38.280	65.0	338036	02/10/98	12:30 AM	3.45	38.290	65.0	338123	87
4	02/09/98	08:30 AM	30.4	29.800	65.5	264000	02/09/98	10:45 AM	2.25	29.800	65.5	264000	0
7	02/09/98	09:03 PM	30.4	38.270	65.1	337806	02/10/98	01:15 AM	4.20	38.270	65.1	337806	0
8	02/09/98	09:03 PM	30.4	38.290	65.1	337983	02/10/98	01:30 AM	4.45	38.290	65.1	337983	0
6	02/09/98	09:03 PM	30.4	38.240	65.9	337458	02/10/98	12:50 AM	3.78	38.240	65.9	337458	0
9	02/14/98	06:30 PM	30.1	24.109	62.8	215532	02/14/98	08:47 PM	2.28	24.109	62.8	215532	0
10	02/14/98	06:30 PM	30.1	24.080	62.6	214827	02/14/98	08:47 PM	2.28	24.080	62.5	214838	11
18	02/15/98	01:30 AM	30.1	58.256	65.8	511587	02/15/98	03:55 AM	2.42	58.250	65.6	511581	-6
16	02/15/98	01:30 AM	30.1	57.935	63.9	509444	02/15/98	03:55 AM	0.92	57.930	63.8	509426	-18
15	02/20/98	07:00 AM	30.0	58.185	59.9	512179	02/20/98	09:00 AM	2.00	58.184	59.9	512170	-9
11	02/24/98	11:30 PM	30.3	58.662	58.1	517146	02/25/98	03:12 AM	3.70	58.660	58.1	517129	-17
13	02/24/98	11:30 PM	30.3	58.669	64.8	515749	02/25/98	02:52 AM	3.37	58.667	64.8	515732	-17
12	02/26/98	08:00 PM	30.2	58.714	55.9	518690	02/26/98	10:50 PM	2.83	58.712	55.6	518740	50
14	02/26/98	08:00 PM	30.2	58.610	60.2	515828	02/26/98	10:25 PM	2.42	58.610	60.1	515853	25
7	03/23/98	12:30 PM	29.9	21.731	65.9	193975	03/23/98	02:30 PM	2.00	21.731	65.5	194014	39
3	03/23/98	08:30 PM	29.9	24.041	66.5	213986	03/23/98	10:45 PM	2.25	24.040	66.4	213986	0
4	03/23/98	08:30 PM	29.9	23.956	67.6	213004	03/23/98	11:20 PM	2.83	23.956	67.3	213032	28
6	03/23/98	11:10 AM	29.9	20.840	66.7	186189	03/23/98	01:55 PM	2.75	20.840	66.6	186197	8
5	03/23/98	11:10 AM	29.9	20.870	64.9	186668	03/23/98	01:20 PM	2.17	20.870	64.9	186668	0
8	03/23/98	12:30 PM	29.9	21.747	65.5	194158	03/23/98	02:30 PM	2.00	21.747	65.9	194127	-31
10	03/25/98	12:07 PM	30.0	34.123	65.0	301907	03/25/98	02:30 PM	2.38	34.120	65.0	301881	-26
9	03/25/98	12:07 PM	30.0	34.237	64.9	303453	03/25/98	02:30 PM	2.38	34.233	65.0	303403	-50
11	03/28/98	06:00 PM	30.0	56.596	67.6	496974	03/28/98	09:18 PM	3.30	56.590	67.4	496966	-8
12	03/28/98	06:00 PM	30.0	55.364	66.9	486981	03/28/98	09:50 PM	3.83	55.360	66.7	486985	4
16	03/29/98	12:30 PM	29.9	32.044	70.1	283209	03/29/98	02:30 PM	2.00	32.041	69.9	283208	-1
15	03/30/98	12:30 AM	29.9	33.804	71.1	298148	03/30/98	03:20 AM	2.80	33.800	70.9	298140	-8
17	03/30/98	10:30 PM	29.9	57.391	70.2	503188	03/31/98	03:06 AM	4.60	57.380	70.0	503138	-50
18	03/30/98	07:38 AM	29.9	57.080	69.9	500436	03/30/98	10:30 AM	2.87	57.077	69.7	500455	19
11	04/07/98	11:30 AM	30.0	48.889	64.3	430568	04/07/98	01:30 PM	2.00	48.889	64.3	430568	0
12	04/07/98	11:30 AM	30.0	49.274	60.3	435261	04/07/98	03:00 PM	3.50	49.275	60.4	435248	-13
18	04/09/98	09:30 PM	29.9	56.497	62.5	497013	04/09/98	11:30 PM	2.00	56.494	62.4	497006	-7
16	04/10/98	07:30 PM	29.8	31.866	59.1	283051	04/10/98	09:30 PM	2.00	31.866	58.9	283076	25
17	04/12/98	07:00 AM	30.0	56.819	61.9	500065	04/12/98	09:00 AM	2.00	56.813	61.8	500038	-27
4	04/17/98	06:30 PM	29.5	43.385	67.7	381773	04/17/98	10:00 PM	3.50	43.400	67.5	381939	166
3	04/17/98	06:30 PM	29.5	45.188	66.8	397690	04/17/98	09:35 PM	3.08	45.190	66.7	397723	33
2	04/17/98	06:30 PM	29.5	20.109	65.3	179281	04/17/98	09:05 PM	2.58	20.110	65.2	179299	18

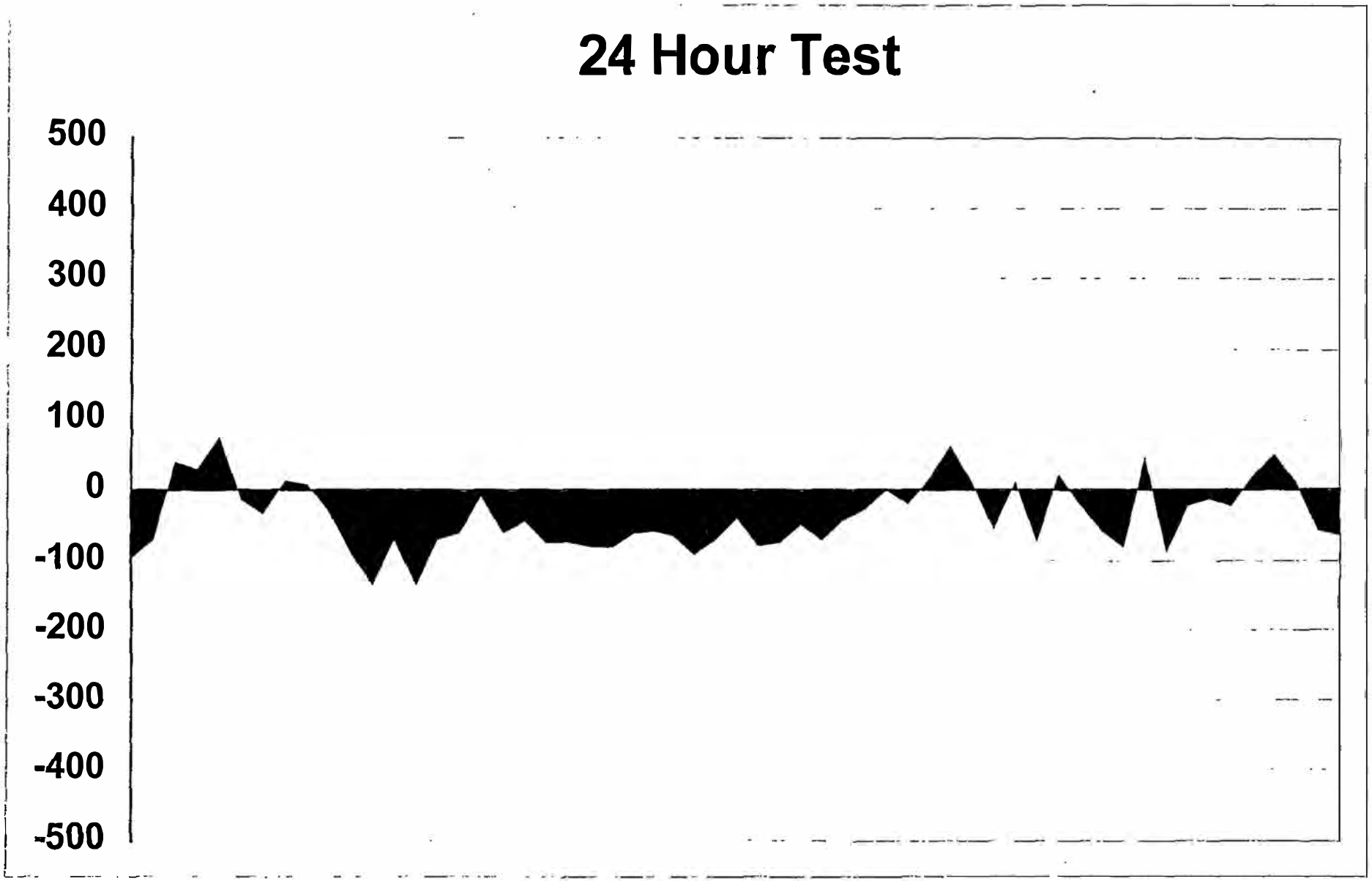
2 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
6	04/20/98	08:30 AM	30.1	55.299	67.7	485433	04/20/98	10:52 AM	2.37	55.290	67.7	485365	-68
8	04/20/98	08:30 AM	30.1	54.868	67.0	481784	04/20/98	11:12 AM	2.70	54.854	66.9	481682	-102
5	04/20/98	08:30 AM	30.1	55.168	66.9	484580	04/20/98	10:32 AM	2.03	55.159	66.9	484511	-69
7	04/20/98	08:30 AM	30.1	54.944	67.2	482407	04/20/98	11:30 AM	3.00	54.929	67.1	482286	-121
9	04/24/98	05:30 AM	29.9	44.778	68.2	394642	04/24/98	07:30 AM	2.00	44.775	68.1	394632	-10
10	04/24/98	05:30 AM	29.9	44.709	67.9	393477	04/24/98	07:30 AM	2.00	44.706	67.8	393470	-7
15	04/26/98	07:00 AM	30.0	58.367	69.6	511548	04/26/98	09:00 AM	2.00	58.358	69.5	511495	-53
18	05/07/98	07:00 PM	30.1	58.253	53.0	514490	05/07/98	10:00 PM	3.00	58.256	53.0	514516	26
16	05/07/98	07:00 PM	30.1	58.318	60.6	513537	05/07/98	10:00 PM	3.00	58.318	60.5	513563	26
9	05/10/98	08:00 PM	30.1	38.209	65.6	337916	05/10/98	10:00 PM	2.00	38.209	65.5	337933	17
10	05/10/98	08:00 PM	30.1	38.124	65.5	336626	05/10/98	10:00 PM	2.00	38.124	65.4	336640	14
8	05/29/98	06:15 PM	29.9	47.580	65.8	418658	05/29/98	08:45 PM	2.50	47.580	65.9	418637	-21
6	05/29/98	06:15 PM	29.9	47.540	66.3	418261	05/29/98	08:30 PM	2.30	47.540	66.3	418261	0
5	05/29/98	06:15 PM	29.9	47.580	65.9	418791	05/29/98	08:15 PM	2.00	47.580	65.9	418791	0
7	05/29/98	06:15 PM	29.9	47.570	66.1	418518	05/29/98	09:00 PM	2.80	47.570	66.1	418518	0
4	05/30/98	09:00 AM	29.9	45.890	66.9	403685	05/30/98	10:00 AM	1.00	45.890	66.9	403685	0
2	05/30/98	09:00 AM	29.7	46.050	66.6	404501	05/30/98	10:00 AM	1.00	46.050	66.6	404501	0
16	06/18/98	09:30 AM	29.9	57.653	67.7	506128	06/18/98	11:30 AM	2.00	57.653	67.8	506108	-20
18	06/18/98	09:30 AM	29.9	57.784	67.3	507143	06/18/98	11:30 AM	2.00	57.784	67.3	507143	0
10	06/22/98	07:00 AM	30.0	31.690	66.0	280623	06/22/98	09:00 AM	2.00	31.687	66.0	280597	-26
9	06/22/98	07:00 AM	30.0	31.402	66.0	278639	06/22/98	09:00 AM	2.00	31.399	65.9	278624	-15

24 HOUR TESTS

STATISTICS

Sample Standard Deviation	47.32	bbls
Average	-37.02	bbls
Maximum	75	bbls
Minimum	-135	bbls
Average Length of Test	24.5	hours
Test Resolution (SSD/Avg hrs)	1.93	bbls/hr


24 Hour Test
500
400
300
200
100
0
-100
-200
-300
-400
-500

24 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
14	03/13/97	08:15 AM	30.0	21.690	67.2	193473	03/14/97	10:05 AM	25.83	21.660	65.3	193377	-96
12	03/13/97	08:15 AM	30.0	21.740	68.1	194441	03/14/97	09:25 AM	25.17	21.710	65.9	194371	-70
15	03/15/97	10:00 AM	30.0	57.180	48.8	505899	03/16/97	10:00 AM	24.00	57.172	48.3	505939	40
13	03/15/97	10:00 AM	30.0	44.112	46.4	392217	03/16/97	10:00 AM	24.00	44.109	46.1	392246	29
16	03/21/97	04:12 PM	29.6	58.468	59.9	515005	03/22/97	04:50 PM	24.63	58.463	59.4	515080	75
17	04/08/97	11:00 PM	30.7	58.010	66.8	509324	04/09/97	11:00 PM	24.00	57.998	66.4	509310	-14
18	04/08/97	11:00 PM	30.7	57.688	66.2	506541	04/09/97	11:00 PM	24.00	57.676	65.9	506508	-33
13	04/10/97	02:00 PM	30.2	50.157	44.6	445626	04/11/97	02:00 PM	24.00	50.163	44.8	445639	13
12	04/10/97	01:00 PM	30.2	20.077	52.1	181286	04/11/97	01:00 PM	24.00	20.075	51.8	181294	8
10	04/11/97	03:00 PM	30.0	38.234	73.0	336449	04/12/97	03:00 PM	24.00	38.218	72.3	336419	-30
17	05/01/97	08:00 AM	30.3	51.896	73.6	454748	05/02/97	08:00 AM	24.00	51.867	72.8	454661	-87
13	05/13/97	11:30 AM	30.3	33.304	66.4	294774	05/14/97	11:30 AM	24.00	33.281	65.9	294639	-135
14	05/13/97	11:30 AM	30.3	33.412	69.4	294945	05/14/97	11:30 AM	24.00	33.390	68.5	294875	-70
13	05/13/97	11:30 AM	30.3	33.304	66.4	294774	05/14/97	11:30 AM	24.00	33.281	65.9	294639	-135
14	05/13/97	11:30 AM	30.3	33.412	69.4	294945	05/14/97	11:30 AM	24.00	33.390	68.5	294875	-70
13	05/24/97	02:30 PM	30.2	57.893	72.2	507306	05/25/97	02:30 PM	24.00	57.889	72.3	507246	-60
15	06/01/97	01:30 PM	30.1	55.558	63.1	488568	06/02/97	01:30 PM	24.00	55.557	63.1	488559	-9
13	07/10/97	11:00 PM	29.3	58.363	71.5	511577	07/11/97	11:00 PM	24.00	58.343	71.0	511517	-60
12	07/10/97	11:00 PM	29.3	37.568	72.4	331334	07/11/97	11:00 PM	24.00	37.553	71.8	331290	-44
16	07/13/97	07:30 PM	29.7	48.882	77.1	428060	07/14/97	07:30 PM	24.00	48.858	76.4	427986	-74
15	07/13/97	07:30 PM	29.7	49 313	77.1	431487	07/14/97	07:30 PM	24.00	49.289	76.4	431413	-74
10	07/24/97	03:10 AM	29.3	11 098	74.3	101402	07/25/97	03:30 AM	24.33	11.081	72.8	101322	-80
10	08/07/97	11:00 PM	29.4	27 610	76.1	244077	08/08/97	11:00 PM	24.00	27.593	75.5	243996	-81
12	09/26/97	12:30 PM	29.7	58.363	68.6	512710	09/27/97	12:30 PM	24.00	58.353	68.5	512649	-61
14	09/26/97	10:00 PM	29.7	34 202	69.1	301851	09/27/97	10:00 PM	24.00	34.180	68.1	301793	-58
13	09/26/97	10:30 PM	29.7	33.824	69.4	298899	09/27/97	10:30 PM	24.00	33.801	68.4	298834	-65
13	09/26/97	09:30 PM	29.7	33.827	69.4	298925	09/27/97	10:00 PM	24.50	33.801	68.4	298834	-91
10	09/27/97	08:30 AM	29.7	29.930	69.9	264871	09/28/97	08:30 AM	24.00	29.908	68.9	264800	-71
13	10/07/97	05:00 PM	30.1	33.148	60.5	294194	10/08/97	05:00 PM	24.00	33.130	59.6	294155	-39
10	10/13/97	04:00 PM	30.2	37.139	69.1	327532	10/14/97	04:00 PM	24.00	37.111	68.0	327453	-79
14	10/26/97	12:30 PM	30.0	45.764	66.3	402711	10/27/97	02:30 PM	26.00	45.716	64.4	402637	-74
10	11/08/97	08:00 AM	30.2	55.428	66.7	486872	11/09/97	08:00 AM	24.00	55.405	66.0	486824	-48
16	11/23/97	12:30 PM	30.1	58.066	65.2	510288	11/24/97	12:30 PM	24.00	58.016	63.6	510217	-71
15	11/23/97	12:30 PM	30.1	58.276	65.7	511650	11/24/97	12:30 PM	24.00	58.224	63.9	511608	-42
18	12/06/97	03:30 PM	30.2	40.701	64.8	359017	12/07/97	03:30 PM	24.00	40.676	63.6	358989	-28
15	12/06/97	03:30 PM	30.2	58.462	65.8	513243	12/07/97	03:30 PM	24.00	58.462	65.8	513243	0
17	12/06/97	03:30 PM	30.2	40.926	65.6	360974	12/07/97	03:30 PM	24.00	40.898	64.2	360954	-20
16	12/06/97	03:30 PM	30.2	57.867	65.3	508530	12/07/97	03:30 PM	24.00	57.840	64.2	508545	15
14	12/19/97	12:30 PM	30.0	54.844	57.3	483597	12/20/97	12:30 PM	24.00	54.831	56.5	483658	61
13	12/19/97	12:30 PM	30.0	57.833	67.4	507882	12/20/97	12:30 PM	24.00	57.795	65.9	507892	10
10	12/19/97	12:30 PM	30.0	21.600	64.7	193076	12/20/97	12:30 PM	24.00	21.577	63.0	193022	-54
18	01/14/98	10:10 PM	30.2	43.047	52.5	381516	01/16/98	01:20 AM	27.17	43.027	51.4	381527	11
16	01/14/98	10:10 PM	30.2	56.550	53.2	499751	01/16/98	01:20 AM	27.17	56.519	52.3	499679	-72
14	02/19/98	09:00 AM	30.0	58.202	60.7	512156	02/20/98	09:00 AM	24.00	58.184	59.9	512177	21
10	03/29/98	03:00 PM	29.9	43.453	66.0	382890	03/30/98	03:00 PM	24.00	43.437	65.3	382870	-20
15	03/29/98	03:30 PM	29.9	33.809	71.7	298110	03/30/98	03:30 PM	24.00	33.781	70.3	298053	-57
16	03/29/98	02:30 PM	29.9	32.041	69.9	283208	03/30/98	04:00 PM	25.50	32.014	68.7	283128	-80
12	03/29/98	03:30 PM	29.9	55.324	65.9	486848	03/30/98	03:30 PM	24.00	55.309	65.1	486893	45
18	03/30/98	03:30 PM	24.0	57.062	69.6	500501	03/31/98	07:00 PM	27.50	57.030	68.7	500414	-87

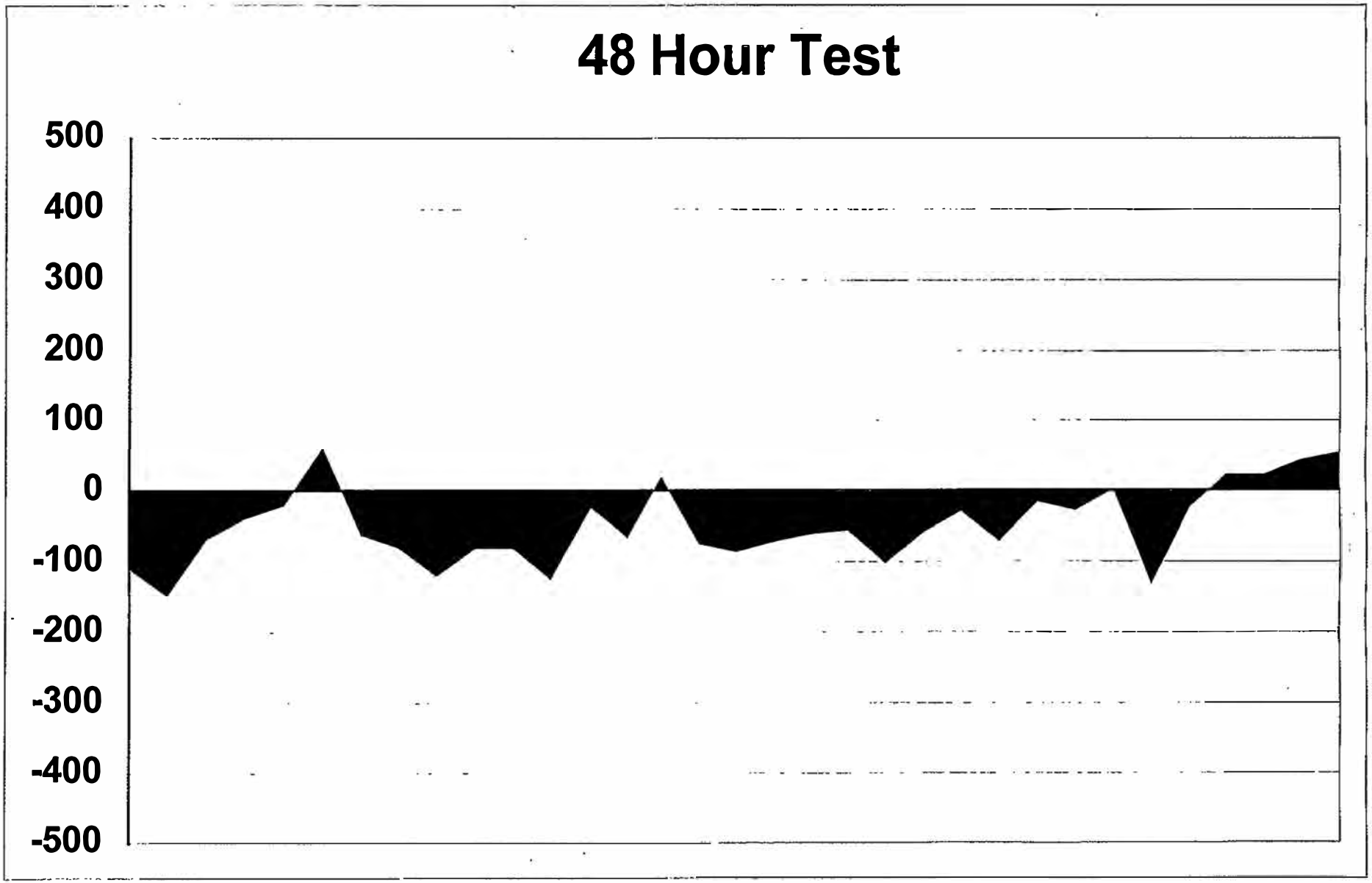
24 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
12	04/07/98	11:30 AM	30.0	49.274	60.3	435261	04/08/98	11:30 AM	24.00	49.265	60.0	435239	-22
18	04/09/98	09:30 PM	29.9	56.494	62.4	497006	04/10/98	11:30 PM	26.00	56.477	61.8	496993	-13
16	04/10/98	07:30 PM	29.8	31.866	59.1	283051	04/11/98	09:30 PM	26.00	31.852	58.3	283028	-23
17	04/12/98	07:00 PM	30.0	56.810	61.9	499987	04/13/98	07:00 PM	24.00	56.797	61.3	500007	20
18	05/07/98	07:00 PM	30.1	58.253	53.0	514490	05/08/98	10:00 PM	27.00	58.251	52.7	514539	49
16	05/07/98	07:00 PM	30.1	58.318	60.6	513537	05/08/98	10:00 PM	27.00	58.301	59.9	513548	11
10	05/10/98	10:00 PM	30.1	38.124	65.4	336640	05/11/98	11:00 PM	25.00	38.107	64.8	336583	-57
10	06/22/98	07:00 AM	30.1	31.690	66.0	280620	06/23/98	07:00 AM	24.00	31.681	65.9	280556	-64

48 HOUR TESTS

STATISTICS

Sample Standard Deviation	54.04	bbls
Average	-48.76	bbls
Maximum	61	bbls
Minimum	-148	bbls
Average Length of Test	48.7	hours
Test Resolution (SSD/Avg hrs)	1.11	bbls/hr


48 Hour Test
500
400
300
200
100
0
-100
-200
-300
-400
-500

48 HOUR TESTS

TANK	Date	Time	API Gravity	Level (ft)	Temp (°F)	Volume (bbls)	Date	Time	Test Hours	Level (ft)	Temp (°F)	Volume (bbls)	Volume Change
13	03/11/97	01:10 PM	30.0	44.152	47.7	392346	03/13/97	02:25 PM	49.25	44.124	46.9	392237	-109
18	03/13/97	05:25 PM	30.0	24.990	64.8	222388	03/15/97	09:47 PM	52.37	24.940	61.9	222240	-148
16	04/06/97	05:00 PM	29.8	51.357	69.4	451030	04/08/97	05:00 PM	48.00	51.319	68.1	450962	-68
15	04/06/97	05:00 PM	29.8	51.817	69.4	454709	04/08/97	05:00 PM	48.00	51.780	68.0	454670	-39
12	04/10/97	01:00 PM	30.2	20.077	52.1	181286	04/12/97	01:00 PM	48.00	20.070	51.6	181265	-21
13	04/10/97	02:00 PM	30.2	50.157	44.6	445626	04/12/97	02:00 PM	48.00	50.173	45.0	445687	61
15	05/01/97	08:00 AM	30.3	58.247	72.2	509901	05/03/97	08:00 AM	48.00	58.208	71.0	509839	-62
16	05/01/97	08:00 AM	30.3	58.553	69.0	513648	05/03/97	08:00 AM	48.00	58.517	68.0	513568	-80
18	05/01/97	08:00 AM	30.3	51.754	73.8	453362	05/03/97	08:00 AM	48.00	51.707	72.4	453242	-120
18	05/03/97	08:00 AM	30.3	51.707	72.4	453242	05/05/97	02:00 PM	54.00	51.674	71.4	453161	-81
18	05/03/97	08:00 AM	30.3	51.707	72.4	453242	05/05/97	02:00 PM	54.00	51.674	71.4	453161	-81
14	07/10/97	11:00 PM	29.3	37.401	73.7	328940	07/12/97	11:00 PM	48.00	37.368	72.6	328816	-124
17	07/10/97	11:00 PM	29.3	57.935	73.8	507120	07/12/97	11:00 PM	48.00	57.904	72.7	507096	-24
14	07/24/97	07:30 PM	29.3	37.275	69.1	328522	07/26/97	07:30 PM	48.00	37.259	68.6	328456	-66
17	08/07/97	11:00 PM	29.4	57.541	68.1	504978	08/09/97	11:00 PM	48.00	57.528	67.5	504997	19
12	09/26/97	12:30 PM	29.7	58.363	68 6	512710	09/28/97	12:30 PM	48.00	58.333	67.8	512635	-75
10	09/28/97	07:00 AM	29.7	29.908	69.0	264786	09/30/97	07:00 AM	48.00	29.872	67.1	264700	-86
10	10/14/97	01:30 AM	30.2	37.127	68.7	327487	10/16/97	01:30 AM	48.00	37.081	66.5	327415	-72
12	10/26/97	01:00 PM	30.0	42.694	67.3	376656	10/28/97	01:00 PM	48.00	42.627	64.2	376595	-61
10	11/08/97	08:00 AM	30.2	55 428	66.7	486872	11/10/97	08:00 AM	48.00	55.384	65.2	486816	-56
16	11/23/97	12:30 PM	30.1	58 066	65.2	510288	11/25/97	12:30 PM	48.00	57.981	62.4	510186	-102
15	11/23/97	12:30 PM	30.1	58 276	65.7	511650	11/25/97	12:30 PM	48.00	58.188	62.6	511591	-59
16	12/05/97	03:30 PM	30.2	57 903	66.5	508574	12/07/97	03:30 PM	48.00	57.840	64.2	508545	-29
17	12/05/97	03:30 PM	30.2	40 956	66 9	361025	12/07/97	03:30 PM	48.00	40.898	64.2	360954	-71
15	12/05/97	03:30 PM	30.2	58 503	67 0	513322	12/07/97	03:30 PM	48.00	58.435	64.5	513306	-16
18	12/05/97	03:30 PM	30.2	40.701	64 8	359017	12/07/97	03:30 PM	48.00	40.676	63.6	358989	-28
18	01/14/98	10:10 PM	30.2	43 047	52.5	381516	01/16/98	10:15 PM	48.08	43.012	50.7	381518	2
16	01/14/98	10:10 PM	30.2	56.550	53 2	499751	01/16/98	10:15 PM	48.08	56.497	51.7	499620	-131
16	03/29/98	02:00 PM	29.9	32.014	68.7	283128	03/31/98	02:00 PM	48.00	31.991	67.3	283104	-24
10	03/29/98	03:00 PM	29.9	43.437	65.3	382870	03/31/98	03:00 PM	48.00	43.422	64.4	382893	23
18	05/07/98	07:00 PM	30.1	58.253	53.0	514490	05/09/98	10:00 PM	51.00	58.235	52.2	514512	22
16	05/07/98	07:00 PM	30.1	58.318	60.6	513537	05/09/98	10:00 PM	51.00	58.286	59.2	513580	43
11	06/04/98	12:30 PM	30.1	33.710	58.8	299140	06/06/98	12:30 PM	48.00	33.710	58.4	299194	54

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE
Industry Preparedness and Pipeline Program

TONY KNOWLES, GOVERNOR
555 Cordova Street
Anchorage, AK 99501
PHONE: (907) 269-3094
FAX: (907) 269-7687
http://www.state.ak.us/dec

April 11, 2000

OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN APPROVAL

Mr. Robert J. Shoaf
Vice President
Alyeska Pipeline Service Company
1835 S. Bragaw, MS 528
Anchorage, AK 99512

File No. 304.30

Dear Mr. Shoaf:

SUBJECT: **Valdez Marine Terminal, Oil Discharge Prevention and Contingency Plan, dated November 1, 1999, as revised. ADEC Plan Number # 993-CP-4097**

The Alaska Department of Environmental Conservation has completed review of the July 13, 1999 application for approval of the following Oil Discharge Prevention and Contingency Plan #993-CP-4097.

Plan Name and dates:	**Valdez Marine Terminal Oil Discharge Prevention and Contingency Plan November 1, 1999 as amended January 23, 2000 and February 22, 2000.**
Plan holder:	**Alyeska Pipeline Service Company, Anchorage, Alaska 1835 S. Bragaw, MS 528 Anchorage, Alaska 99512**
Facility:	**Valdez Marine Terminal, P. O. Box 300, Valdez, Alaska 99686**
Supporting Document:	**Valdez Marine Terminal Emergency Contingency Action Plan, EC 71, Second Edition, Revision 8, dated February 8, 2000.**

PLAN APPROVAL: The Department has determined that the referenced plan satisfies minimum planning standards and other requirements established under applicable statutes and regulations. Therefore, the Valdez Marine Terminal Oil Discharge Prevention and Contingency Plan is hereby approved, effective **April 11, 2000**. This approval supersedes the previous plan approval and certificate of approval issued by the Department, dated January 13, 2000, for the

Mr. Paul Hankins, Alyeska SERVS, Valdez
Mr. Brad Hahn, ADEC/PERP, Anchorage
Mr. Tom Lakosh
Ms. Betty Schorr, TAPS/JPO Section Manager, Anchorage
Project File

facility covered by this plan. A certificate of approval stating that the contingency plan has been approved by the Department is enclosed.

This approval is subject to the following terms and conditions:

TERMS AND CONDITIONS:

Condition No. 1. Response Contractors

a. Notice of Changed Relationship with Response Contractor. Because the plan relies on the use of response contractor(s) for its implementation, the plan holder must immediately notify the Department in writing of any change in the contractual relationship with the plan holders response contractor(s), and of any event including but not limited to any breach by either party to the response contract that may excuse a response contractor from performing, that indicates a response contractor may fail or refuse to perform, or that may otherwise affect the response, prevention, or preparedness capabilities described in the approved plan.

This condition is reasonably necessary because there are certain risks associated with allowing a plan holder to rely in part or total upon a response contractor instead of obtaining its own response capability. The risks arise, in part, because the certainty of the contractor's response is dependent upon the continuation of the legal relationship between it and the plan holder. Given this risk, the Department must be promptly informed of any change of the contractual relationship between the plan holder and the response contractor, and of any other event that may arguably excuse the response contractor from performing or that would otherwise affect the response, prevention, or preparedness capabilities described in the approved plan. The Department may seek appropriate modifications to the plan or take other steps to ensure that the plan holder has continuous access to sufficient resources to protect the environment and to contain, cleanup, and mitigate potential oil spills.

Condition No. 2. Renewal

a. To renew this approval, the plan holder must submit a complete application by July 8, 2002. A representative must be designated to administer the contingency plan application renewal and to coordinate all matters related to the contingency plan.

b. Within 30 days of this plan approval action the Designated Representative will meet with representatives of the Department, and continue to meet thereafter on a monthly basis. The purpose of these meetings will be to discuss the following topics: assurance of compliance with the conditions of approval; coordination of drills, inspections, training or other activities related to the contingency plan; updating best available technology or other requirements which may apply to the Facility at the time of the next renewal application; introduction of plan amendments as necessary; identifying and resolving issues that may affect expeditious submission, review, and approval of renewal

application. By the 15th of each month, the Designated Representative will submit to the Department a monthly summary status update on conditions.

c. The Department, at its discretion, may seek advisory input or consultation with subject matter experts or other stakeholders regarding spill response and contingency planning issues. The Department, at its discretion, will inform stakeholders of significant items to be addressed by the plan holder prior to submission of an application for renewal as a means to facilitate expeditious review.

This condition is reasonable and necessary as a plan condition under AS 46.04.030(e) to ensure plan holders compliance with the requirements of AS 46.04.030(d), AS 46.04.030(e), 18 AAC 75.415 and 18 AAC 75.420, the conditions of the department's plan approval, and to implement drills and exercises authorized by (AS 46.04.030(e)(1)-(4).

Condition No. 3. Scenarios

a. During the current plan approval period, the plan holder will participate in a scenario workgroup. The workgroup will be co-chaired by ADEC and the plan holder. The objective of the workgroup will be to improve the response planning scenarios to clearly demonstrate that strategies and procedures are in place to conduct and maintain an effective response and are usable as a general guide for a discharge of any size. Draft scenarios are due in written form to the Department by April 1, 2001. Final scenarios are due in written form to the Department by April 1, 2002. Final scenarios will be incorporated into the July 8, 2002 plan renewal application and will be approved as part of the April 2003 plan renewal.

This condition is reasonable and necessary as a plan condition under AS 46.04.030 (e) to ensure plan holders compliance with 18 AAC 75.425 (e)(1)(F), 18 AAC 75.445(d)(3), 18 AAC 75.445(d)(4), 18 AAC 75.445 (d)(5) as well as to provide continuing improvements in the plan.

Condition No. 4. Multi-year Exercise Schedule

a. Within 60 days of plan approval the plan holder will provide the Department a multi-year field exercise schedule. These exercises will be carried out through the term of the plan approval and will:

1. exercise all scenarios in the plan up to and including the RPS scenarios;
2. exercise or field test the containment and control tactics for "on land" containment, including the use of the containment ponds;
3. provide a description of the scope and objectives for each exercise, drill or test, giving the schedule for each.

The multi-year schedule may be modified or amended, with the approval of the Department, provided all the required exercises are carried out during the term of the plan approval.

b. A written status report on the multi-year field exercises is due to the Department on January 15th, April 15th, July 15th, and October 15th of each year until completed. The status report shall provide contacts, locations, and projected schedules for the upcoming quarter. The status report shall also contain summaries of the training activities performed in the previous quarter including: identification of specific training, lessons learned, site conditions during the exercise, successes, deficiencies and suggested improvements to those tactics, and a listing of those who participated.

This condition is reasonable and necessary to ensure that response strategies are sufficient to meet the applicable response planning standards of 18 AAC 75.432 and .436. This condition also ensures that response strategies are appropriate and reliable for preventing oil from entering environmentally sensitive areas and areas of public concern as required by 18 AAC 75.445(d)(4). AS 46.04.030.

Condition No. 5. On Land Tactics Guide Public Review Requirement

a. The planholder has taken proactive steps to address concerns related to on land containment and has agreed to develop a Settlement Pond Tactical Guide. In accordance with Part 2, Section 2.7.5, a final Settlement Pond Tactical Guide must be submitted to the Department by January 1, 2001. This guide will be submitted to the Department as a plan amendment and will be subject to public review prior to incorporation into the plan.

This condition is reasonable and necessary to ensure that response strategies are sufficient to meet the applicable response planning standards of 18 AAC 75.432 and .436. This condition also ensures that response strategies are appropriate and reliable for preventing oil from entering environmentally sensitive areas and areas of public concern as required by 18 AAC 75.445(d)(4). AS 46.04.030(e and supports continuous improvement in the plan.

Condition No. 6. Hatchery and Duck Flats Protection Capabilities Public Review Requirement

a. The planholder has taken proactive steps to develop and put in place methods aimed at enhancing the protection equipment and strategies used for the Hatchery and Duck Flats. In accordance with Part 2, Section 2.7.5, a plan amendment must be submitted to the Department by January 1, 2001 which updates the Hatchery and Duck Flats protection plan. This amendment will be subject to public review prior to incorporation into the plan.

This condition is reasonable and necessary to ensure that response strategies are sufficient to meet the applicable response planning standards of 18 AAC 75.432 and .436. This condition also ensures that response strategies are appropriate and reliable for preventing oil from entering

environmentally sensitive areas and areas of public concern as required by 18 AAC 75.445(d)(4). AS 46.04.030(e) and supports continuous improvement in the plan.

Condition No. 7. Testing of Tank 53 through 56 Leak Detection Systems

a. By October 1, 2000, the planholder shall have all Enraf gauging systems installed and fully operational on each of these tanks as described in Alyeska's letter dated January 23, 2000 under Issue #6, a revision to Part 2, Section 2.7.1.2, paragraph 9 of the plan. By March 31, 2001 the planholder shall provide sufficient actual performance information from the Enraf gauging systems for the Department to confirm final compliance with the leak detection requirement. This information must include a detailed description of the system's thresholds and sensitivities. If the systems do not obtain results comparable to those used on the crude oil tanks without cathodic protection at the facility (taking into account the differences in tank size), the Department may disapprove the use of this system as leak detection to meet the requirements of 18 AAC 75.065(i)(1)(A-D). If the Department find this leak detection method unacceptable, the plan holder will have 60 days from the date of notification to submit an alternative leak detection method for consideration by the Department.

This condition is reasonable and necessary as a plan compliance condition to ensure oil storage tank leak detection or spill prevention systems comply with the requirements specified in 18 AAC 75.065. AS 46.04.030(e).

Condition No. 8. Secondary Containment Systems for Tank Truck Loading Areas and Permanent Unloading Areas

a. By November 1, 2000 each active tank truck loading or permanent unloading area must be retrofitted with secondary containment that meets the requirements of 18 AAC 75.075(g)(1-4) or must be taken out of service until compliance can be achieved.

This condition is reasonable and necessary as a plan compliance condition to ensure tank truck loading and permanent unloading areas comply with the requirements specified in 18 AAC 75.075(g). AS 46.04.030(e).

Condition No. 9. Risk Assessment Public Review Requirement

a. In the pursuit of continuous plan improvement, the planholder has proposed development of a new risk assessment. In accordance with Part 2, Section 2.7.5, the final risk assessment report must be submitted to the Department as a plan amendment by April 1, 2001. This amendment will be subject to public review prior to incorporation into the plan.

This condition is reasonable and necessary to ensure that response strategies are sufficient to meet the applicable response planning standards of 18 AAC 75.432 and .436. This condition also ensures that response strategies are appropriate and reliable for preventing oil from entering

environmentally sensitive areas and areas of public concern as required by 18 AAC 75.445(d)(4). AS 46.04.030(e), and supports continuous improvement in the plan.

Condition No. 10. Plan Edits

a. Within 45 days of this approval action, the plan holder will submit the conforming plan edits agreed to by plan holders in their responses to the Department's requests for additional information dated 1/23/00 and 2/22/00 for the plan.

This condition is reasonable and necessary as a plan condition under AS 46.04.030(e) to ensure the plan holders compliance with the approved plan.

EXPIRATION: This approval **expires April 10, 2003.** After the approval expires, facility operations are prohibited by Alaska law until an approved plan is once again in effect.

REVOCATION, SUSPENSION, OR MODIFICATION: This approval is effective only while the plan holder is in "compliance with the plan" as approved on April 11, 2000 and with all of the terms and conditions described above. The Department may, after notice and opportunity for a hearing, revoke, suspend, or require the modification of an approved plan if the plan holder is not in compliance with it, or for any other reason stated in AS 46.04.030(f). In addition, Alaska law provides that a vessel or facility that is not in "compliance with the plan" may not operate (AS 46.04.030). The Department may terminate approval prior to the expiration date if deficiencies are identified that would adversely affect spill prevention, response or preparedness capabilities.

DUTY TO RESPOND: Notwithstanding, any other provisions or requirements of this contingency plan, a person causing or permitting the discharge of oil is required by law to immediately contain and cleanup the discharge regardless of the adequacy or inadequacy of a contingency plan (AS 46.04.020).

NOTIFICATION OF NON-READINESS: Within twenty four (24) hours after any significant response equipment specified in the plan becomes non-operational or is removed from its designated storage location, the plan holder must notify the Department in writing and provide a schedule for equipment substitution, repair, or return to service (18 AAC 75.475(b)).

CIVIL AND CRIMINAL SANCTIONS: Failure to comply with the plan may subject the plan holder to civil liability for damages and to civil and criminal penalties. Civil and criminal sanctions may also be imposed for any violation of AS 46.04, any regulation issued thereunder, or any violation of a lawful order of the Department.

INSPECTIONS, DRILLS, RIGHTS TO ACCESS AND VERIFICATION OF EQUIPMENT, SUPPLIES AND PERSONNEL: The Department has the right to verify the ability of the plan holder to carry out the provisions of its contingency plan and access to inventories of equipment, supplies and personnel through such means as inspections and discharge exercises, without prior notice to the plan holder. The Department has the right to enter and inspect the covered vessel or facility in a safe manner at any reasonable time for these purposes and to otherwise ensure compliance with the plan and the terms and conditions (AS 46.04.030(e) and AS 46.04.060). The plan holder shall conduct exercises for the purpose of testing the adequacy of the contingency plan and its implementation (18 AAC 75.480 and 485).

FAILURE TO PERFORM: In granting approval of the plan, the Department has determined that the plan, as represented to it by the applicant in the plan and application for approval, satisfies the minimum planning standards and other requirements established by applicable statutes and regulations, taking as true all information provided by the applicant. The Department does not warrant to the applicant, the plan holder, or any other person or entity: (1) the accuracy or validity of the information or assurances relied upon; (2) that the plan is or will be implemented; or (3) that even full compliance and implementation with the plan will result in complete containment, control, or clean-up of any given oil spill, including a spill specifically described in the planning standards. The plan holder is encouraged to take any additional precautions and obtain any additional response capability it deems appropriate to further guard against the risk of oil spills and to enhance its ability to comply with its duty under AS 46.04.020(a) to immediately contain and clean up an oil discharge.

COMPLIANCE WITH APPLICABLE LAWS: If amendments to the approved plan are necessary to meet the requirements of any new laws or regulations, the plan holder must submit an application for amendment to the Department at the above address. The plan holder must adhere to all applicable state statutes and regulations as they may be amended from time to time. This approval does not relieve the plan holder of the responsibility for securing other federal, state or local approvals or permits, and that the plan holder is still required to comply with all other applicable laws.

ADJUDICATORY HEARING: Any person who disagrees with the decision may request an adjudicatory hearing by serving upon the Commissioner a request for hearing that complies with the requirements of 18 AAC 15.200-310. Hearing requests must be delivered to the Commissioner of the Department of Environmental Conservation at 410 Willoughby Ave, Suite 105, Juneau, AK 99801-1795 within 30 days of receipt of this letter. If a hearing is not requested within 30 days, the right to a hearing is waived and the decision becomes final. Please send a copy of the hearing request to the undersigned.

If you have any questions, please contact Betty Schorr at (907) 271-4389.

Sincerely,

Susan Harvey
Program Manager

Enclosure: Certificate of Approval, Number 00 CER-3377

cc w/o enclosure:

Mr. Jerry Brossia, A●, BLM/JPO
Mr. Bill Britt, SPC, ADNR/JPO
Mr. Carl Lautenberger, EPA/JPO
Mr. Mike Wrabetz, BLM/JPO
Mr. Phil Brna, ADF&G/ JPO
Mr. Jim Taylor, USDOT/OPS, Washington, DC
Ms. Kris O'Connor, ADNR, Anchorage
Commander Payton Coleman, COTP, USCG/MSO, Valdez
Mr. Larry Hancock, City Manager, City of Cordova
Mr. R. J. Kopchak, City Planner, City of Cordova
Ms. Carol Smith, Director, City of Valdez
Ms. Carrie Williams, Coastal Coordinator, City of Whittier
Mr. Garry Kompkoff, Village of Tatitlek
Mr. Darrell Totemoff, Village of Chenaga
Mr. John Devens, Executive Director, PWS RCAC, Valdez
Mr. Joe Banta, Project Manager, PWS RCAC, Anchorage
Ms. Lynda Hyce, PWS RCAC, Valdez
Mr. Dennis Maguire, Alyeska SERVS, Valdez
Ms. Jule Magee, Alyeska SERVS, Valdez
Mr. Paul Hankins, Alyeska SERVS, Valdez
Mr. Brad Hahn, ADEC/PERP, Anchorage
Mr. Tom Lakosh
Ms. Betty Schorr
Project File

Alaska Department of Environmental Conservation
Division of Spill Prevention and Response
Industry Preparedness and Pipeline Program

Valdez Marine Terminal Oil Discharge Prevention and Contingency Plan

Final Findings Document

And

Response to Comments

April 11, 2000

INTRODUCTION

What is this Document ?

This document presents the final findings of the Alaska Department of Environmental Conservation (ADEC) concerning the contents of the Valdez Marine Terminal Oil Discharge Prevention and Contingency Plan (plan), dated November 1, 1999 with additional information submitted January 23 and February 22, 2000. The contingency plan addresses activities related to prevention, containment, and clean up of oil discharges from the operation of the Valdez Marine Terminal.

These draft findings were written as a result of an extensive review of the plan and consideration of public comment. They are presented to assist the interested public and participating reviewers in understanding the analysis of priority issues by which the Department has arrived at its decision to approve the Valdez Marine Terminal Oil Discharge Prevention and Contingency Plan. State law provides for the Department to attach reasonable terms and conditions to its approval of a contingency plan that it determines are necessary to ensure preparedness or to ensure that the plan holder can comply with the plan. This document provides the basis for the terms and conditions that appear in the Department's plan approval.

A portion of this document also contains the Department's response to written comments received during the extended comment period. (The public comment period began on November 3, 1999 and because of the volume of additional information reviewed, was extended through March 20, 2000). All comments received by the deadline have been considered by the Department. This document does not respond to all of the individual comments , but rather is a response to the most substantive issues raised by commenters. Individuals that may desire to understand the Department's review of a particular comment not mentioned here may write or call for further information by contacting ADEC at 411 West 4th Avenue, Anchorage, Alaska 99501, or call at (907) 271-5070.

What Has Been the Process to Approve the Plan?

This review is the required triennial renewal of the 1997 approved plan. The review process began with the submittal of a draft plan on July 13, 1999. The plan was initially found not sufficient for public review. Revisions were made to the plan and a revised version was submitted to the Department in November 1999. In response to the amount of public interest, the Department extended the review period from the usual 30 to 68 days. During this time, the Department held public hearings to take testimony regarding the plan in Anchorage and Valdez.

Because the Department received a great deal of additional information from Alyeska during this period, the Department extended the public review until March 20, 2000 to allow for additional comments. After extensive review of the plan and consideration of the public comments, the Department found that the plan met the criteria for plan approval as specified in Alaska law.

Although the ADEC is responsible for coordinating a single agency review of this contingency plan, many of the analysis in this document represent the combined efforts of the participating agencies of the Joint Pipeline Office (JPO), a consortium of eleven state and federal agencies. In addition to the involvement of the JPO's Oil Spill Preparedness, Prevention and Response Team, the Department utilized the expertise of JPO's technical staff for certain issues.

What Does it Mean When a Contingency Plan is Approved?

A plan is approved when a plan holder has demonstrated in the plan that a level of prevention and readiness has been accomplished to prevent a spill, or if a spill should occur, to effectively respond. The Department does not made its decision to approve a plan based on the operator proving everything in the plan, but rather upon the reasonableness of assertions and evidence that certain essential resources and practices are secured. Therefore, the ADEC's work does not end once the contingency plan is approved. The contingency plan approval is only a portion, although a major one, of the entire program of spill prevention and response. Many follow-up field tasks are done to proof the plan and assure that persons assigned response and prevention duties are trained and ready to respond if need be. The tasks range from both planned and unannounced inspections and oil spill exercises, regular surveillance of field operations, training audits, third party engineering inspections for checking structural integrity of tanks and piping and applying lessons learned from actual incident responses.

Changes in this Contingency Plan

There have been several significant changes in the operation and management of the Valdez Marine Terminal by the plan holder, Alyeska Pipeline Service Company, since the last plan approval in 1997.. Some examples include a reduction in oil through put, changes to the facility such as the addition of the vapor recovery system and a recent management reorganization. These changes have contributed, in part, to changes in the contingency plan.

Many improvements have been made to the 1999 renewal plan as compared to the 1997 plan. Significant portions of the plan have been updated to reflect recent changes in the operations of the Terminal. The general format of the plan has been changed to make the document more practical for use during a spill. An example of this kind of change is the use of checklists to direct response actions in an incident. Many of the structural changes have made this plan consistent with the Price William Sound Tanker plans. Since Alyeska and particularly SERVS is the lead responder in both plans, this change helps ensure consistency.

In the new plan format, spill response tactics have been standardized. Each response area has specific tactics assigned alphanumeric identifiers. These tactics are summarized in tables in the appropriate supplementary information document and referred to by these identifiers in the scenario section.

The prevention section has been upgraded substantially. Alyeska has added initiatives to the compliance section where it commits to conduct a new risk assessment and create a tactical guide for on land oil spill response. These and other initiatives are described in the compliance section of the plan, Section 2.7.

A Best Available Technology section has been added to identify the use of best available technology for those areas specified in state regulations.

Conditions imposed by the Department to the 1997 approval of the plan have resulted in many changes as well. Improvements have been made to the fire prevention and control section, a "Sensitive Areas Tactical Guide for Port Valdez" has been created and an aggressive maintenance and monitoring system to ensure the stability of the rock slopes at the Terminal has been instituted.

Format for This Document:

The issues identified in this document have come about as a result of the Department's step by step analysis of the submitted plan, additional information provided by the plan holder and careful consideration of written comments from the public. Issues in these Final Findings are listed in the general order and format as listed in the state regulations governing contingency plan contents; Title 18, Chapter 75 of the Alaska Administrative Code. This document tracks those issues first raised by the Department in the Draft Findings. In some cases, the issue may have been resolved as a result of additional information provided by Alyeska, in other instances, the Department has found that changes to the plan were necessary or a condition of approval was required to correct a deficiency. The original 12 issues from the Draft Findings are followed by additional responses to comments not covered by a Draft Finding.

This document uses the following format to address each of the selected topics:

(1) Statement of Issue

(2) Findings

(3) Regulatory Authority

(4) Response to Comments

(5) Basis for Decision

The Department has benefited from and appreciates the contribution of many individuals and organizations made during the public process of reviewing and approving this plan. Any questions concerning these findings may be directed to Betty Schorr at (907) 271-4389.

Table of Contents

ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
ANS	Alaska North Slope
APSC	Alyeska Pipeline Service Company
BAT	Best Available Technology
BWT	Ballast Water Treatment
C-plan	Contingency Plan (Oil Discharge Prevention and Contingency Plan)
Condition No	Condition (of Approval) Number
Condition of Approval	Condition listed in the Contingency Plan Approval
FF1	Fire Fighting 1
JPO	Joint Pipeline Office
ICS	Incident Command System
NFPA	National Fire
NOAA	National Oceanographic
OJT	On the Job Training
RCAC	Regional Citizen's Advisory Council
RFAI	Request for Additional Information
SID	Supplemental Information Document
VMT	Valdez Marine Terminal

ISSUE #1: PREVENTING OR CONTROLLING A POTENTIAL FIRE HAZARD

STATEMENT OF ISSUE

Does the plan contain an oil spill response strategy that provides a description of methods to prevent or control a potential fire hazard?

FINDINGS

The Department finds the plan holder's description in the new plan of the methods to prevent or control a potential fire hazard during spill response to be adequate. The Department understands that there are plans to include new tugs in the SERVs fleet with additional fire response capabilities. When those new tugs are in place, the plan holder should include those resources in its description in Part 1, Section 2.2.6 of the plan as a routine plan update under 18 AAC 75.415. During this review the Department received additional information regarding the availability of the tugs reflected in the plan, and the information was consistent with and supported the timeframes in the plan.

The Department will continue to track any recommended follow up actions on the Terminal fire prevention and suppression system required as a result of JPO's and/or the Fire Marshall's VMT Fire Assessment.

REGULATORY AUTHORITY

The contingency plan regulation dealing with fire hazards during spill response is 18 AAC 75.425 (e)(1)(F)(ii). This regulation requires that the plan contain an oil spill response strategy that provides "a description of methods to prevent or control a potential fire hazard..."

RESPONSE TO COMMENTS

RCAC recommended that any changes to the SERVs fleet of tugs be reflected and submitted as an amendment to the VMT plan to describe the availability of fire fighting vessels at the VMT. This recommendation has been adopted (see "Findings" above). However, note that plan amendments are only subject to public review when it is determined that the change will "diminish the plan holder's ability to respond to an oil discharge," per 18 AAC 75.415(a).

RCAC also requested that Alyeska develop a listing of vapor suppression options, and agreed to pursue this in the Risk Assessment work group described in the plan revisions, Section 2.7.5. For more information regarding vapor suppression, see Issue #3, "Response Strategies."

Mr. Lakosh commented that Alyeska misrepresented the availability of fire tugs at the VMT. However, the Department's review of the information submitted by Alyeska (that being a detailed summary of the escort missions conducted by the tugs over a two-week period) demonstrated that the plan accurately reflects the tugs' availability.

BASIS FOR DECISION

The issue of preventing or controlling a potential fire hazard during spill response was the subject of a finding during the 1996 review of Alyeska's Valdez Marine Terminal Oil Discharge Prevention and Contingency Plan. In response to numerous public comments, the Department solicited an independent third party opinion concerning fire safety related issues at the VMT. The Department's goal was to specifically determine if the plan adequately included a description of methods to prevent or control a potential oil spill related fire hazard. As a result, the consulting firm of Hildebrand and Noll Associates, Inc. issued a report, *Valdez Marine Terminal: Preventing or Controlling a Fire Hazard During a Spill Response*. This report was used to help the Department determine the amount of information that would be appropriate to be contained in an Oil Discharge Prevention and Contingency Plan. A condition of plan approval was established in the January 14, 1997 VMT Plan approval. This condition required Alyeska to submit the additional information recommended by the Hildebrand and Noll Associates, Inc. report. The condition of approval included the following requirement:

- an air monitoring strategy for a spill to determine if an area is safe, unsafe or dangerous with the establishment of action levels based on instrument readings. This should be done for a potential spill size up to and including the Response Planning Standard volume;

- procedures for establishing hazard control zones, which include site safety diagrams, charts, and checklists;

- a time line for practical guidance on when a large spill should be expected to be in the flammable range and general guidelines for how long a foam blanket would need to be maintained on the spill to avoid the build up of hazardous vapors and;

- modification to the plan to include a reference to the interface with the fire fighting command structure.

The plan holder provided the required information that was approved by the Department and this language is incorporated into the draft revised plan now under review.

A portion of the Hildebrand and Noll Associates review in 1996 was an analysis of the fire fighting capability for a Terminal incident. At that time, the consultant evaluated the availability of personnel and equipment and found these to be adequate and "generally representative of the type of equipment currently in use to protect similar hazards". The consultant also found that the equipment is on par with equipment that would b

considered "Best Available Technology" (Valdez Marine Terminal: Preventing or Controlling a Fire Hazard During a Spill Response, Final Report, 1996, Hildebrand and Noll Associates VMT document number 1555-1580).

Between the current and the draft renewal plan, Alyeska modified the text that addresses the fire fighting capability of tug boats at the Terminal ("Fire Control Section"). While the current plan states that three tug boats are available at the Terminal, each providing an elevated fire monitor with a capacity of 3500 gpm and 5,000 gallons concentrate foam, the renewal plan, in contrast, outlines the capabilities of the SERVS escort fleet which is composed of vessels designed to American Bureau of Shipping Class 1 Fire Fighting Vessel standards.

In contrast to the three docking tugs described in the current plan, the proposed plan describes that a docking tug and a sentinel vessel are present at all times within the Port. Although the current fleet now has additional escort tugs that are FF1 rated, these tugs are not always at the Terminal, since their primary duty is to provide escort for the tankers. The plan holder has indicated in other correspondence that SERVS intends to make additional changes to the fleet during the next plan approval period. The future fleet is planned to include three additional general purpose tugs which will also be FF1 rated. Text in the revised plan states that these vessels can be recalled to the Terminal and that depending on their location and weather conditions, can generally be back to the Terminal within 1 to 6 hours of notification. After review of the information provided, which detailed the tug's escort missions over a two-week period, and with the understanding that any future changes to the SERVs fleet must be submitted as an amendment to this plan, the Department finds that the proposed plan under review accurately reflects the tug availability for response at the terminal.

Another fire prevention and response issue at the Terminal relates to the operability of the fire prevention and suppression systems as they currently exist at the Terminal, and are described in the plan. In May and September of 1999, Joint Pipeline Office (JPO) staff conducted an assessment of the fire system at the Terminal. The assessment included a review of the system's operational capability and an audit of the preventative maintenance records. The assessment concluded that most of the preventative maintenance and testing requirements of the system are being met. However, the assessment did identify exceptions, namely, the surveillance revealed that exposed piping was not being inspected annually for leaks and that fire mains were not being flow tested every five years. The JPO also determined that the management of the fire suppression system could be improved. On October 15, 1999, the Joint Pipeline Office issued an order to APSC requiring that preventative maintenance inspection and testing of the fire suppression systems be conducted to the frequency requirements established in NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water based Fire Protection Systems*. The Department does not have direct jurisdiction of the VMT fire suppression system, and therefore will continue to track Alyeska's progress in completing the Joint Pipeline Office's required follow up actions.

ISSUE #2: PROTECTING ENVIRONMENTALLY SENSITIVE AREAS

STATEMENT OF ISSUE

Does the plan provide for sufficient oil discharge response equipment, personnel, and other resources to protect environmentally sensitive areas or areas of public concern before oil reaches them?

FINDINGS

The Department finds that the plan could be improved to ensure that sufficient resources are available to protect environmentally sensitive areas and areas of public concern in Port Valdez. The Department accepts Alyeska's proposal to amend Part 2, Section 2.7.5 of the plan to include language stating that methods will be developed in 2000 and 2001 aimed at decreasing the time it takes to deploy equipment to protect the waters around the terminal and the Duck Flats and Solomon Gulch Hatchery. Because specific methodologies are still under consideration, the final proposed action(s) will be subject to public review and comment (see Condition No. 6), and must be submitted to the Department no later than January 1, 2001.

Additional commitments in Alyeska's training program for the contract-fishing vessel fleet, originating in the Prince William Sound Tanker plan review, have been added to the VMT C-plan which assure that trained crews are available to deploy protective tactics at the identified sensitive areas in Port Valdez. (Please also refer to Issue #4, "Oil Spill Response Training.") Any changes to the Prince William Sound Tanker C-plans, as a result of it's Conditional Approval (Approval #6, "Fishing Vessel Response," or #7, "Fishing Vessel Training Requirements") shall also be incorporated into this plan as appropriate.

REGULATORY AUTHORITY

The regulations under 18 AAC 75.425(e)(1)(F)(v) require: "for a stationary facility or operation...procedures and methods to exclude oil from environmentally sensitive areas and areas of public concern identified under (3)(J) of this subsection, including for a land-based facility, protection of ground water and public water supplies;"

The regulation under 18 AAC 75.445(d) states "(d) Response strategies. The response strategies must take into account the type of product discharged and must demonstrate that...

(4) sufficient oil discharge response equipment, personnel, and other resources are maintained and available for the specific purpose of preventing discharged oil from entering an environmentally sensitive area or an area of public concern that would likely be impacted if a discharge occurs, and that this equipment and personnel will be deployed and maintained on a time schedule that will

protect those areas before oil reaches them according to the predicted oil trajectories for an oil discharge of the volumes established under 18 AAC 75.430 - 18 AAC 75.442; areas identified in the plan must include areas added by the Department as a condition of plan approval."

RESPONSE TO COMMENTS

RCAC requested specific information about resources that would be used to simultaneously protect the two environmentally sensitive areas and the leading edge of a large oil spill, but accepts the proposed work group to address these issues, and expressed appreciation for inclusion in the working group.

RCAC also requested that the methodologies developed in this process be available for public review, which ADEC will require. (See Condition No. 6).

Mr. Lakosh expressed concern about Alyeska's ability to respond to a nearshore sensitive area under low wind conditions, due to the potential for hazardous vapors. Please see Issue #3 for a complete discussion about vapor hazards and oil spill response actions.

BASIS FOR DECISION

The plan holder must be capable of protecting sensitive areas in Port Valdez while simultaneously containing and controlling the further spread of oil in a catastrophic incident. The current plan does not clearly demonstrate this capability and requires further analysis. At the Department's request, Alyeska conducted a demonstration exercise on September 24th, 1999 where exclusion booming was deployed at three environmentally sensitive areas near the Terminal. Although many aspects of this demonstration were successful. the Department is concerned that there may not be enough resources available to protect the Valdez Duck Flats and the Solomon Gulch Hatchery in the early hours of an incident when many competing response actions must occur.

The Duck Flats and the Solomon Gulch Hatchery are prioritized for protection in the plan through the use of the Sensitive Area Protection Mobilization Decision Matrix. This matrix was added to the current plan as a result of the 1997 plan review and approval process. The matrix provides criteria and assessment points for use by the initial incident commander within the first one or two hours of a spill. Based upon information received about the spill. immediate and rapid deployment of protective oil spill boom is expected for the Duck Flats and the Solomon Gulch Hatchery. Currently. personnel from SERVS are responsible to conduct this deployment. During the RPS Scenario Drill held on September 1st and 2nd, the protection of the Solomon Gulch Hatchery and the Duck Flats were given priority according to the criteria of the matrix. However. actions to contain and control free oil were delayed because some of the same limited resources that were needed to protect the Solomon Gulch Hatchery were also needed to protect the Duck Flats. The Response Planning Scenario currently in the plan shows resources being used for deployment at the first and the same resources going to the Duck Flats three hours later.

The Department is concerned that during a real incident, the delay in the mobilization of the free oil task forces could potentially result in loss of opportunities to timely control or contain the further spread of oil. Although the protection of the Duck Flats and the Solomon Gulch Hatchery remain a priority, the Department would like to further explore with the plan holder the most strategic use of resources. The Department would like to ensure that: (1) sensitive areas closest to the Terminal are protected and (2) the leading edge of the spill is controlled as early as possible to prevent additional sensitive areas threats. Alyeska has agreed to improve methodologies (including possible pre-deployment of equipment) to be able to more quickly protect these sensitive areas.

Fishing vessel fleet training has been adequately addressed by the text added in Alyeska's January 23, 2000 submittal of additional information, Part 3, SID 2, Section 5.9.3. Please also refer to Issue #4, Oil Spill Response Training.

ISSUE #3: RESPONSE STRATEGIES

STATEMENT OF ISSUE

Has the plan holder provided a description of the actions to be taken to contain and control the spilled oil?

Are the strategies sufficient to meet the applicable response planning standard?

FINDINGS

The Department finds that the plan holder has provided adequate description of the actions to be taken to contain and control spilled oil. The strategies presented are sufficient to meet the applicable response planning standard.

The Department supports Alyeska's initiative to develop a tactical guide for on land containment and control strategies, as set out in Alyeska's revised text of Part 2, Section 2.7.5 in their January 23, 2000 submittal. This guide will be the product of a joint Alyeska. RCAC, JPO and ADEC work group that will commence the initial scoping and participate in the guide development. Although Alyeska states that only Part 1 of the guide will be a SID to the contingency plan, the Department requires that Part 2 also be a SID as it contains supplemental information required under 18 AAC 75.425(e)(3). Submission of Part 2 and a schedule for the tactical guide completion will be a condition of plan approval. Please refer to Condition No. 5.

REGULATORY AUTHORITY

The regulations under 18 AAC 75.425(e)(1)(F) Response Strategies require:

"(vi) a description of the actions to be taken to contain and control the spilled oil, including, as applicable, boom deployment strategies, construction of temporary berms, and other methods;"

The plan approval criteria listed under 18 AAC 75.445(d) states "(d) Response strategies The response strategies must take into account the type of product discharged and must demonstrate that...

(5) plan strategies are sufficient to meet the applicable response planning standard established under 18 AAC 75.430 - 18 AAC 75.442 for containment, control, recovery, transfer, storage, and cleanup within the specified time and under environmental conditions that might reasonably be expected to occur at the discharge site..."

RESPONSE TO COMMENTS

RCAC's comments on this issue generally fell into two categories: on land tactics review and scenario revisions.

First, RCAC requested a careful review of the on land tactics, particularly the use of the settlement ponds to collect oil, to ensure all reasonable efforts to contain oil on land were employed. To address this concern, Alyeska agreed to the development of a "On Land Tactics Guide" by a work group composed of Alyeska, agency and RCAC representatives. See Condition of Approval No. 5.

Second, RCAC requested a careful review of the plan scenarios to more clearly address: actions to be taken, allocation and source of resources, and timelines. RCAC suggested use of a reference document Analysis of Oil Spill Scenarios From the 1998 Prince William Sound Tanker Plan Using Incident Action Plan and Critical Path Methods to meet this goal. The plan holder agreed to a scenario work group to improve the scenarios over the life of the plan. See Condition of Approval No. 3.

Finally, RCAC commented on dispersants use, but agreed to pursue their concerns through ARRT, NOAA or other more appropriate avenues. RCAC's request for a more detailed calculation of the plan's RPS to water was provided in Part 3, SID 1, Section 10.4.7.

Mr. Lakosh's comments relevant to this section fell into three general categories.

1) He expressed concern about Alyeska's ability to meet the RPS requirements because he is of the opinion that hazardous vapors could preclude any response under average conditions.
2) Next, he felt the all marine and on land tactics, particularly source control tactics and procedures, should be intrinsically safe so that hazardous vapors would not preclude an effective response.

3) And finally, he suggested that the RPS volumes should be increased to account for the presence of snow in the oil storage tank's secondary containment areas, and in consideration of local seismic and hydrological factors.

Unfortunately, Mr. Lakosh does not provide a clear technical basis for his assertions.

First, the opinion that the RPS requirements could not be met because Alyeska is unprepared to respond in hazardous vapors is erroneous and unsubstantiated. Average wind conditions may, in part, *support* high vapor concentrations in some situations, but the Department has no evidence to suggest that low wind conditions *ensure* high vapor concentrations at this particular facility, with this particular product (i.e. ANS crude oil). Next, the commenter suggests that source control, containment, clean up and other tactics must be intrinsically safe. This is not accurate. If high vapor concentrations occur, it does not automatically preclude a response. Instead it requires a plan including a response organization, personnel and equipment, strategies, policies and an incident command system adequate to manage these technological challenges. Proper personnel protection and HAZWOPER training is available to deal with the toxicity aspect of crude oil spills and resulting vapors.

Regarding the explosive hazard there are two basic response options that Alyeska could use: (1) assume a defensive (passive) response or (2) with the proper equipment take a more aggressive response. A defensive (passive) response does not mean "do nothing," it simply means that strategies and tactics normally employed when explosive vapors are not present need to modified. Instead of positioning personal and equipment in areas where explosive vapors are present, a larger exclusion zone (i.e. hot zone), established by safety personnel with real-time monitoring instruments, would be established. Response strategies would be revised to work in areas outside the "hot zone" with the goal of minimizing spill spread either by using pre-established structures and drainage systems with strategic blocking and diverting, or by emergency construction of new dams, dikes, diversion and containment structures outside the "hot zone." Then, with the aid of safety personnel and careful monitoring, response equipment could be staged in a safe location to collect oil. The terminal plan contains reference maps that will be useful in developing an effective response strategy when explosive vapors are present. These maps include local topography and local drainage. The plan includes a description of emergency response equipment for construction of temporary containment structures. The plan also includes a description of safety training, safety personnel, and monitoring procedures for establishing safe work zones.

Should a defensive response be insufficient to adequately control the spread of oil, there is the ability to conduct a more aggressive response. A more aggressive response could include similar safety precautions such as establishing and monitoring "hot zones" and then taking actions such as foaming a pool of oil to control vapors or establishing a water spray with terminal fire fighting resources to "knock down" vapors. These more aggressive response actions will allow temporary placement of personnel and equipment in an area formerly designated as a "hot zone". Once personnel are able to work within the "hot zone," time critical actions such as: diking, damming, containing, or recovering with appropriate equipment can be conducted.

Third, the Department finds no need to increase the RPS volume due to large amounts of snow accumulation inside the oil storage tank secondary containment areas, or to require that snow be removed from the secondary containment areas. First, the assumption that the oil would flow over the oil is highly doubtful given the higher temperature of the oil (melting and penetrating the snow) and the generally highly absorptive qualities of snow. Second, even with large volumes of snow in the secondary containment areas, each containment "cell" has enough volume to hold the contents of not one, but two crude oil storage tanks. Therefore, even if the snow did support the initial tide of oil escaping a catastrophic failure of a tank, it is unlikely that it would result in a larger release from secondary containment than is already assumed in the plan (e.g. 203,300 barrels). Regarding local seismic and hydrological factors, these factors are considered in the proposed plan, and the Department finds the analysis complete and accurate, at this time.

BASIS FOR DECISION

The on land strategies and tactics described in the plan under "Containment and Control Strategies" and under "On Land Response" are currently generic. Although many potential containment areas on the Terminal are known and described, site specific information is not currently included in the plan to make effective use of these areas. For example, areas where building berms or digging could be identified based on drainage and materials present. A scheme for blocking particular culverts at settlement ponds to stop the flow of oil could also be included in the plan.

The revised plan, under Section 2.7, Compliance Schedule and Waivers, commits to the development of a "Settlement Pond Tactical Guide" by January 2001. Each of the settlement ponds is to be discussed with tactics, maintenance needs and equipment resources included.

The Department is in agreement that a tactical guide would be very beneficial. The tactical guide would provide clear instructions to maximize the percentage of the discharge that remains on land while minimizing the amount of oil that enters Port Valdez. In addition to utilization of the containment ponds, the Department believes that this guide could be expanded to include a consideration of other appropriate on land tactics. On land tactics are fixed, the Terminal is limited in size, and the opportunities for containment and control are generally known. In addition, the guide will contain information required by 18 AAC 75.425(e)(3) – Supplemental Information.

The Department also finds that Parts 1 and 2 this guide should be included in the plan as a Supplementary Information Document (SID).

ISSUE #4 – OIL SPILL RESPONSE TRAINING

STATEMENT OF ISSUE

1) Has the plan holder demonstrated that, in addition to maintaining continuous compliance with other applicable state and federal training requirements, designated oil spill response personnel are trained and kept current in the specifics of plan implementation? Has the plan holder demonstrated that individuals are trained in spill prevention as appropriate to the position?

2) Does the plan adequately describe the drills and exercises, which are an integral part of the training program?

FINDINGS

The Department's draft findings highlighted that titles and/or job positions need to be correlated to the ICS structure information such that training requirements can be determined and "OJT" can be verified.

Alyeska revised the training program to reinstate the connection between training requirements and personnel job titles. This enables the Department to verify training program compliance for all oil spill response personnel and more specifically for critical incident command structure positions. Thus, the Department finds that the level of oil spill response training for personnel remains equivalent to that listed in the previous plan.

In addition, a multi-year drill and exercise schedule program (draft) has been submitted as part of this contingency plan review. Condition No. 4 commits Alyeska to the following:

1. exercise all scenarios in the plan up to and including the RPS scenarios;
2. exercise or field test the containment and control tactics for "on land" containment, including the use of the containment ponds;
3. provide a description of the scope and objectives for each exercise, drill or test, giving the schedule for each.

In addition, Alyeska has committed to provide quarterly drill/exercise and training reports to the Department (see Alyeska's letter February 22, 2000).

Information regarding the fishing vessel fleet oil spill response training is described in Part 3, SID 2, Section 5.9.3 of the plan. See Issue #2. *Protecting Environmentally Sensitive Areas.*

REGULATORY AUTHORITY

The regulations under 19 AAC 75.425(e)(3)(I) require the plan holder to provide "a detailed description of the training programs for discharge response personnel." As a criteria for plan approval, the department must conclude under 18 AAC 75.445(j) that the plan holder has demonstrated that spill responders are trained, and records are kept verifying training attendance. The regulations read:

> "In addition to maintaining continuous compliance with other applicable state and federal training requirements, the plan holder shall demonstrate that designated oil spill response personnel are trained and kept current in the specifics of plan implementation, including deployment of containment boom, operation of skimmers and lightering equipment, and organization and mobilization of personnel and resources. The plan holder shall ensure that proof of training is maintained for three years and is made available to the Department upon request."

Additionally, oil spill prevention training is required for all personnel (e.g. operators, technicians, maintenance personnel) under 18 AAC 75.007(d):

> "The owner or operator shall ensure that all personnel are appropriately and regularly trained regarding company and state pollution prevention measures that are applicable to each person's duties. After completing a training course or program, each participant shall sign and date a statement that lists the course content."

RESPONSE TO COMMENTS

RCAC requested more detailed information be provided to demonstrate that a minimum number of personnel were trained to fill each ICS position. Although this specific information was not provided, RCAC agreed that this issue and other concerns about personnel availability would be best addressed through a "scenario work group." Alyeska agreed to work with ADEC and RCAC to incorporate suggested personnel training changes over the life of the plan (see Condition No. 3) in their January 23, 2000 response to the Department's request for additional information. See Issue #3 – *Response Strategies*.

BASIS FOR DECISION

Given the revisions submitted since the beginning of the plan review, it now appears that the quantity and content of the training courses proposed in the new plan is equivalent to that in the current plan. Also, the fishing vessel fleet training is now addressed in the plan. Alyeska's submittals of draft "VBU Oil Spill response Exercise Program for the Prince William Sound Tanker and Valdez Marine Terminal Oil Discharge Prevention and Contingency Plans," along with Condition No. 4, also commits them to a defined drill

program. Alyeska has also agreed to institute a work group to address the issue of continuous improvement in personnel training, among other issues.

ISSUE # 5 - OIL TRANSFER PROCEDURES

STATEMENT OF ISSUE

Does the plan describe the facility's oil transfer procedures in sufficient detail, and include all appropriate measures to prevent spills or overfilling?

FINDINGS

Additional information submitted by Alyeska in the January 23, 2000 and February 22, 2000 submittals satisfactorily addressed the concerns of the Department. This information adequately describes the transfer procedures including measures to prevent spills and overfilling.

REGULATORY AUTHORITY

18 AAC 75.025 – Transfer Requirements. This portion of the regulations requires the owner or operator of an oil terminal facility to take all appropriate measures to prevent spills or overfilling during a transfer or oil.

18 AAC 75.425(e)(2) states that "Under the provisions of 18 AAC 75.005 – 18 AAC 75.090. the prevention plan must include a detailed description of all oil discharge prevention measures and policies employed at the facility."

RESPONSE TO COMMENTS

The comments received were aligned with the Department's request for additional information for more detailed oil transfer procedures.

BASIS FOR DECISION

Part 2, Section 2.1.5 of the plan describes three types of oil transfer activities that occur at the facility. For each type of oil transfer activity, only a few points of the transfer procedure were outlined. Therefore. the Department requested more detailed description of each transfer procedure, with an emphasis on how each contributes to pollution prevention and overfill protection, and a description of how they fulfill the requirements of 18 AAC 75.025.

In response to the additional information request. a matrix was submitted which identifies: the manuals or documents that transfer procedures are found in: the title of the procedure; what locations at the facility are affected by the procedure; and what prevention actions(s)

identified in 18 AAC 75 are addressed in the procedure. The Department concludes that this matrix, along with the text edits, adequately describes each procedure and what measures each contains to enhance pollution prevention.

ISSUE # 6: LEAK DETECTION REQUIREMENTS FOR OIL STORAGE TANKS

STATEMENT OF ISSUE

Does the method of leak detection for the fuel oil storage tanks nos. 53 through 56 meet the requirements of 18 AAC 75.065(i)(1) and 18 AAC 75.425(e)(2)(E)?

FINDINGS

Alyeska has committed to equipment upgrades and leak detection methodologies, which meets the requirements of 18 AAC 75.065(i)(1). This commitment is described in Section 2.1.8.2 of the plan, *Leak Detection Program*.

In addition to the commitment described in Section 2.1.8.2 of the plan, the Department will establish a condition of approval, which requires Alyeska to test the system within six months of the installation to ensure compliance with 18 AAC 75.425(e)(2)(E). The Department will also require Alyeska to amend the plan within nine months of the installation to include a detailed description of the system's thresholds and sensitivities.

REGULATORY AUTHORITY

18 AAC 75.065(i)(1)(A through D) contains four separate options of leak detection/spill prevention required on existing oil storage tanks. The leak detection program described in Section 2.1.8.2 – *Leak Detection Program* of the plan, as it pertains to the fuel oil tanks listed above, has been submitted as meeting the requirements of 18 AAC 75.065(i)(1)(A); that is a "sensitive gauging system." However, 18 AAC 75.425(e)(2)(E) requires that the plan contain a "description of the existing and proposed means of discharge detection" and that "if electronic or mechanical instrumentation is employed, detailed specifications, including threshold detection, sensitivities, and limitations of equipment must be provided."

Alyeska's current plan submittal does not fully address the requirements of 18 AAC 75.425(e)(2)(E). Therefore, the Department will require actual system testing to be performed within six months of installation to verify the system's thresholds and sensitivities.

RESPONSE TO COMMENTS

The only public comment the Department received on this issue question the date of installation. Alyeska proposed that the leak detection system be installed prior to October 2000. Commenters suggested that the date be accelerated by one month. The Department finds that the October deadline is appropriate given the construction season and other constraints.

BASIS OF DECISION

The July 1999 contingency plan submittal contained an initial proposed description of the leak detection program for fuel oil storage tanks nos. 53 through 56. The program, as presented, did not meet the requirements of 18 AAC 75.065(i)(1) for the following reasons:

- The proposed leak detection program did not notify an operator of an instantaneous release, and in fact, the facility cannot sufficiently verify the thresholds for detection. Therefore, the requirements of 18 AAC 75.425(e)(2)(E), which requires detailed specifications, threshold detection, sensitivities and limitations of the equipment when electronic or mechanical equipment is employed, cannot be met;
- One, possibly two of the tanks in the system have varec gauges, which do not have the level of accuracy necessary to be considered Best Available Technology.

Thus, the Department found that the original July 1999 proposal was not adequate and the Department directed Alyeska to develop a revised leak detection proposal that would meet the regulatory requirements. In the January 23, 2000 response to the Departments request for information. Alyeska committed to installing Enraf level gauges on fuel oil storage tanks nos. 53 through 56 by October 2000, and automatic valves on the same tanks in the summer of 2000. With the completion of these equipment upgrades, Alyeska has presented a method of leak detection which meets the requirements of 18 AAC 75.065(i)(1)(A).

However, verification of the threshold detection levels and sensitivities, required by 18 AAC 75.425(e)(2)(E), are not available until the system is installed and tested. Therefore, the Department will require that the 18 AAC 75.425(e)(2)(E) requirements are completed no later than 6 months after the implementation of the sensitive gauging system leak detection system for the fuel storage tanks 53, 54, 55 and 56. The Department will also require Alyeska to amend the plan within nine months of the installation to include a detailed description of the system's thresholds and sensitivities. (See Condition No. 7).

Alyeska has presented reasonable compensatory measures to be employed; namely a daily mass balance of tanks 53, 54, 55 and 56, prior to the installation of the approved leak detection system.

ISSUE # 7: REQUIREMENTS FOR TANK TRUCK LOADING AND PERMANENT UNLOADING AREAS

STATEMENT OF ISSUE

Do the VMT truck loading or permanent unloading areas meet the requirements of 18 AAC 75.075(g)?

FINDINGS

The planholder has revised the plan compliance schedule to reflect a commitment to retrofit one of the two truck loading/unloading areas at the Valdez Marine Terminal in 2000, and the second in 2001. However, as stated in the second request for additional information, the Department has determined that either of the truck loading/unloading areas must be brought into compliance no later than November 1, 2000, or they must be taken out of service until full compliance is reached. See Condition of Approval No. 8.

REGULATORY AUTHORITY

18 AAC 75.075(g) requires that all tank truck areas and permanent unloading areas have a secondary containment system that is designed to contain the maximum capacity of any single compartment of the tank truck. The secondary containment system must include containment curbing and a trenching system, or drains with drainage to a collection tank, or a device designed to handle a discharge. In addition, the containment area must be paved, surfaced, or lined with sufficiently impermeable materials, and must be maintained free of debris or other materials or conditions that might interfere with the effectiveness of the system. Finally, the tank truck loading or permanent unloading area must have warning lights, warning signs, or a physical barrier system to prevent premature vehicular movement.

RESPONSE TO COMMENTS

Public comment on this issue requested that the truck loading/unloading facilities at the VMT be brought into full compliance on or before October 2001. The Department is requiring a more aggressive schedule. The condition of approval will require compliance on or before November 1, 2000, or that the facility be taken out of service until full compliance is met.

BASIS FOR DECISION

Section 2.1.5.1 of the C-Plan states that there are two tank truck loading/unloading areas at the VMT. The first is located at four-corners, and the second is located adjacent to tanks 55 and 56. Neither of these tank truck loading/unloading areas complies with the secondary containment requirements of 18 AAC 75.075(g).

Alyeska has committed to upgrade the two tank truck loading/unloading areas to meet the secondary containment area requirements of 18 AAC 75.075(g).

However, Alyeska's proposal to complete one upgrade this construction season, then to complete the second upgrade in the summer of 2001, is unacceptable. Therefore, a condition of this approval requires either upgrading both truck loading/unloading facilities by November 1, 2000, or taking any facility not in compliance with 18 AAC 75.075(g) out of service until compliance can be achieved. (See Condition No. 8).

ISSUE #8: TRANSFER PIPING TESTING REQUIREMENTS

STATEMENT OF ISSUE

Do Alyeska's current methods of testing the BWT pipelines, which are used to transfer oil (and water) to or from docks or vessels, meet the requirements of 18 AAC 75.080(c)?

FINDINGS

The current testing methods do not meet the requirements of 18 AAC 75.080(c) because the piping is not tested at or above the normal operating pressure. However, the Department will waive the requirements 18 AAC 75.080(c) based on the high design pressure rating of this system as compared to its normal operating pressure and the minimal amount of oil included within this water stream. Also considered are the annual testing procedures, historical maintenance, future inspections scheduled for the year 2000, and Alyeska's commitment to provide the Department with results of those inspections and a proposed future inspection and maintenance schedule. The results of the year 2000 inspections must be submitted to the Department for evaluation to qualify for a waiver of required testing under 18 AAC 75.080(c).

REGULATORY AUTHORITY

The regulations under 18 AAC 75.425(e)(2) require that a contingency plan include a detailed description of all oil discharge prevention measures and policies employed at the facility. The regulations at 18 AAC 75.080(c) state, "Buried or insulated transfer piping and hoses that are located outside of secondary containment areas and that are used to transfer oil to or from docks or vessels must be leak tested at least annually, at or above the normal operating pressures, or must be subjected to another verification method approved by the Department."

RESPONSE TO COMMENTS

The comments received were aligned with the Department's request for additional information and final findings.